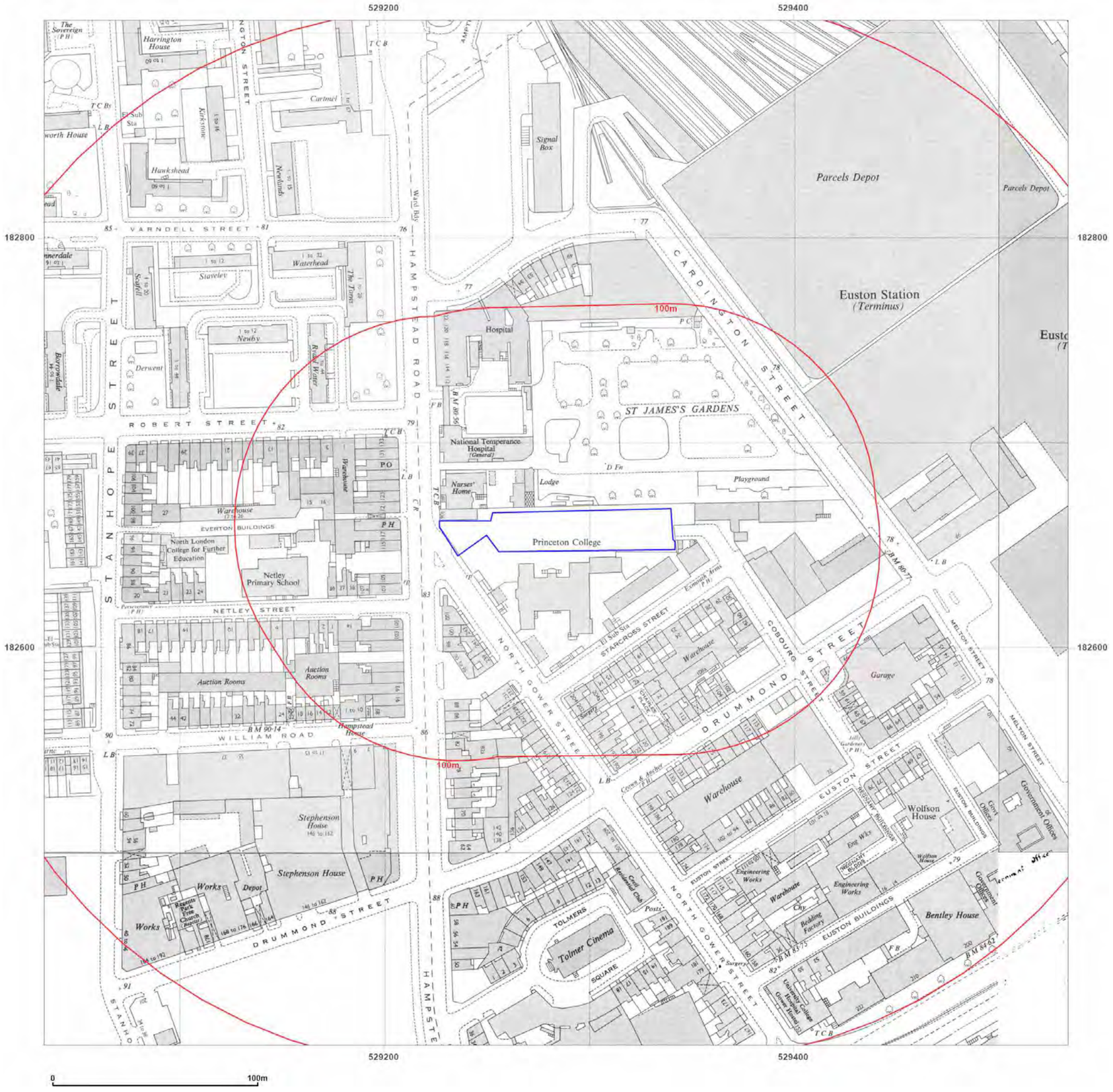

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1969-1973**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1952 Revised 1968 Edition N/A Copyright 1969 Levelled 1953	Surveyed 1952 Revised 1968 Edition N/A Copyright 1969 Levelled 1953
Surveyed 1951 Revised 1968 Edition N/A Copyright 1969 Levelled 1954	Surveyed N/A Revised N/A Edition N/A Copyright 1973 Levelled N/A

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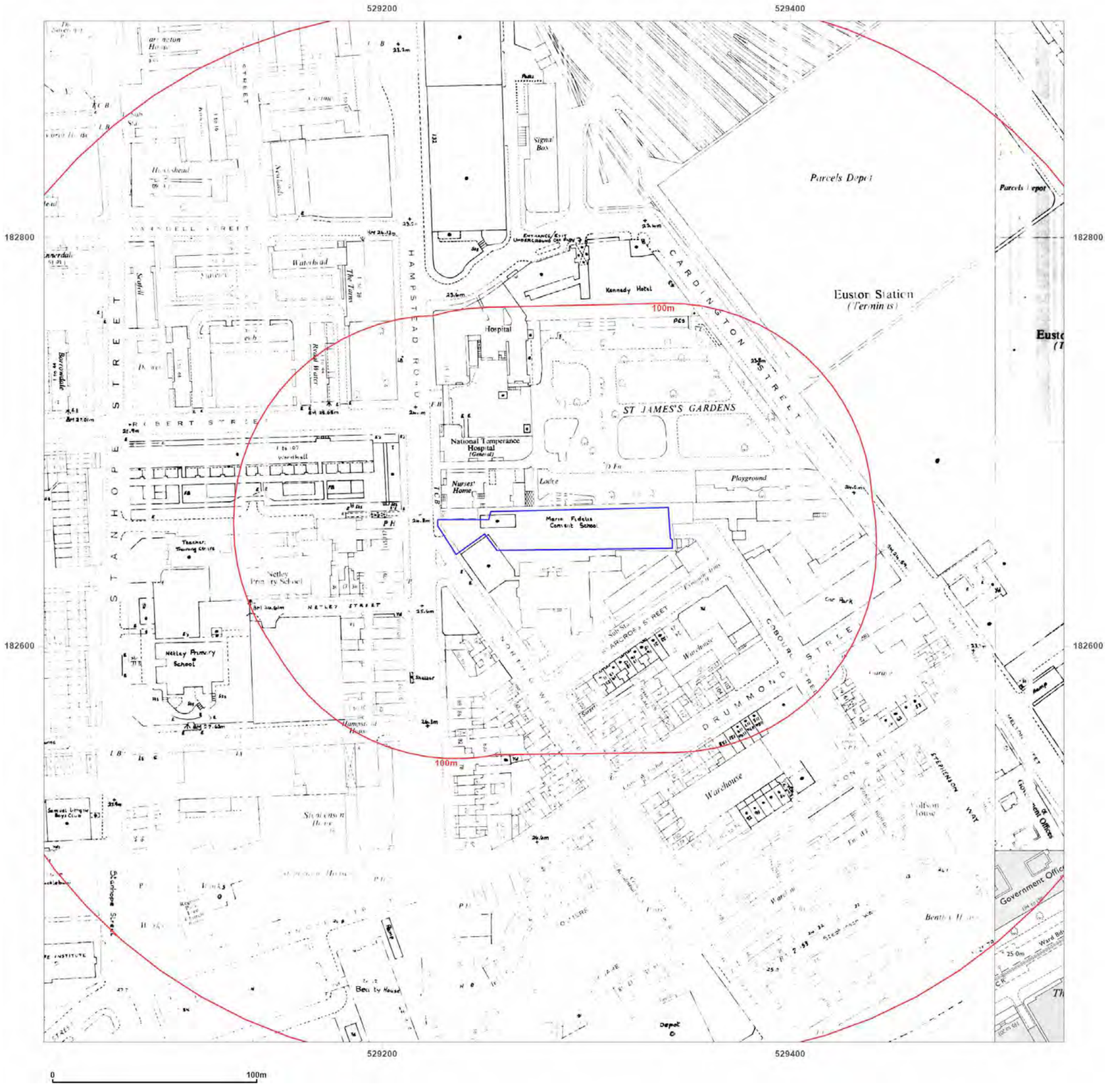
Production date: 11 March 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1977-1978**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1978 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1978 Levelled N/A
Surveyed N/A Revised N/A Edition N/A Copyright 1977 Levelled N/A	Surveyed 1951 Revised 1975 Edition N/A Copyright 1977 Levelled 1953

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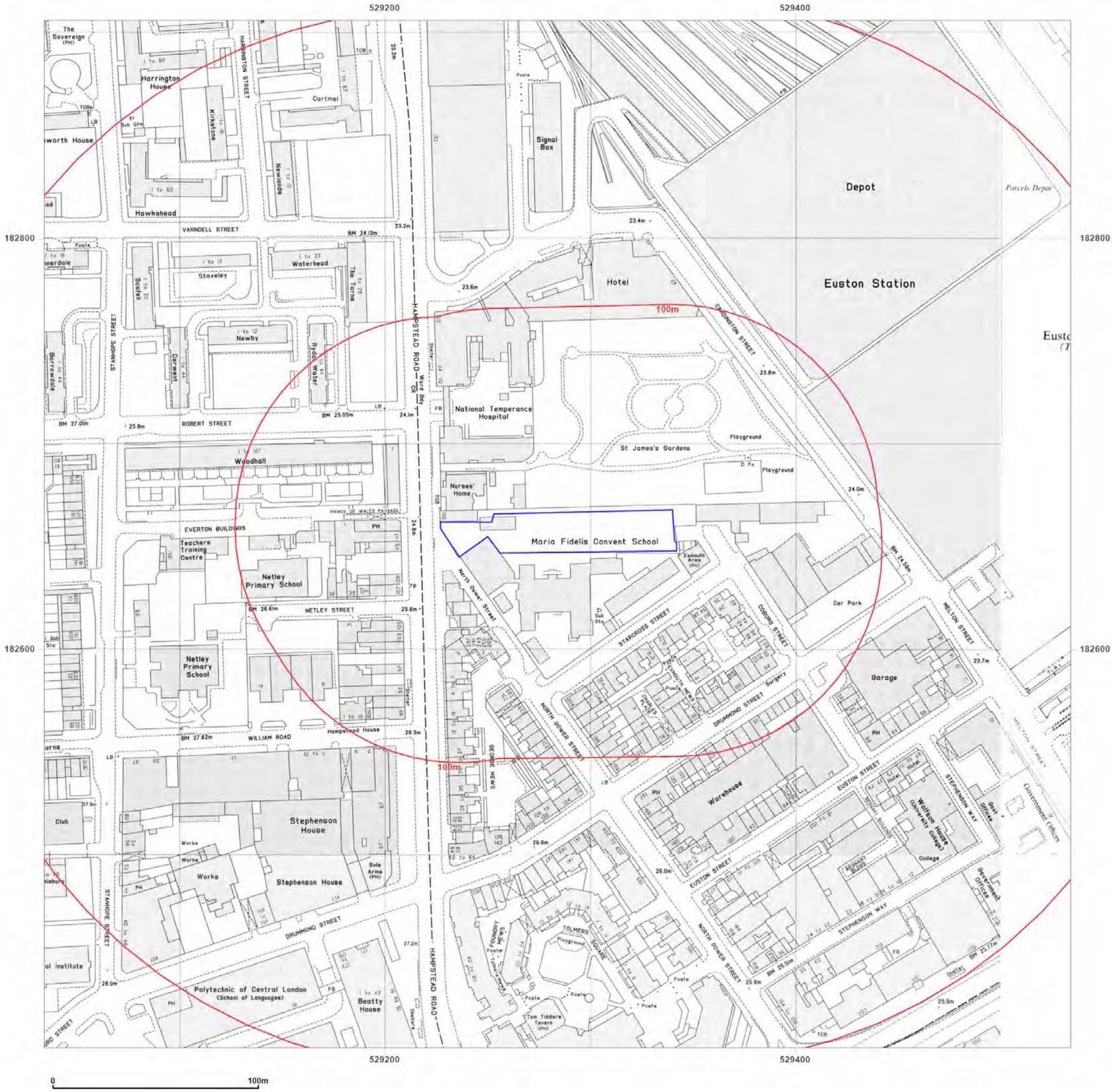

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1985-1986**

Scale: 1:1,250

Printed at: 1:2,000

N
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Surveyed 1985 Revised 1985 Edition N/A Copyright N/A Levelled N/A	Surveyed 1975 Revised 1986 Edition N/A Copyright 1986 Levelled 1975
Surveyed 1985 Revised 1985 Edition N/A Copyright N/A Levelled N/A	

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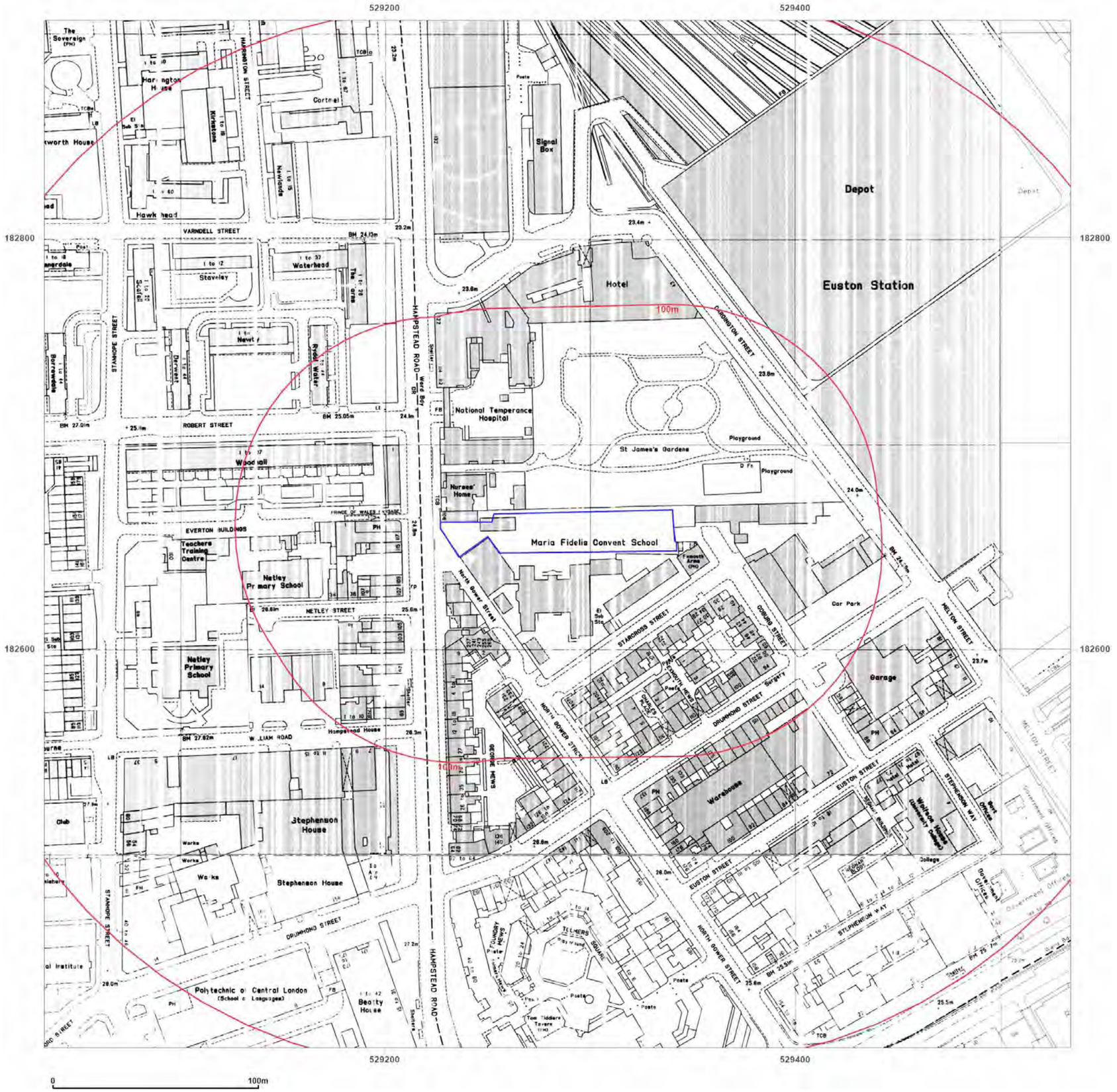

Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A			Surveyed 1991 Revised 1991 Edition N/A Copyright 1991 Levelled N/A
Surveyed N/A Revised N/A Edition N/A Copyright N/A Levelled N/A			Surveyed 1991 Revised 1991 Edition N/A Copyright 1991 Levelled N/A

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1986-1991**

Scale: 1:1,250

Printed at: 1:2,000

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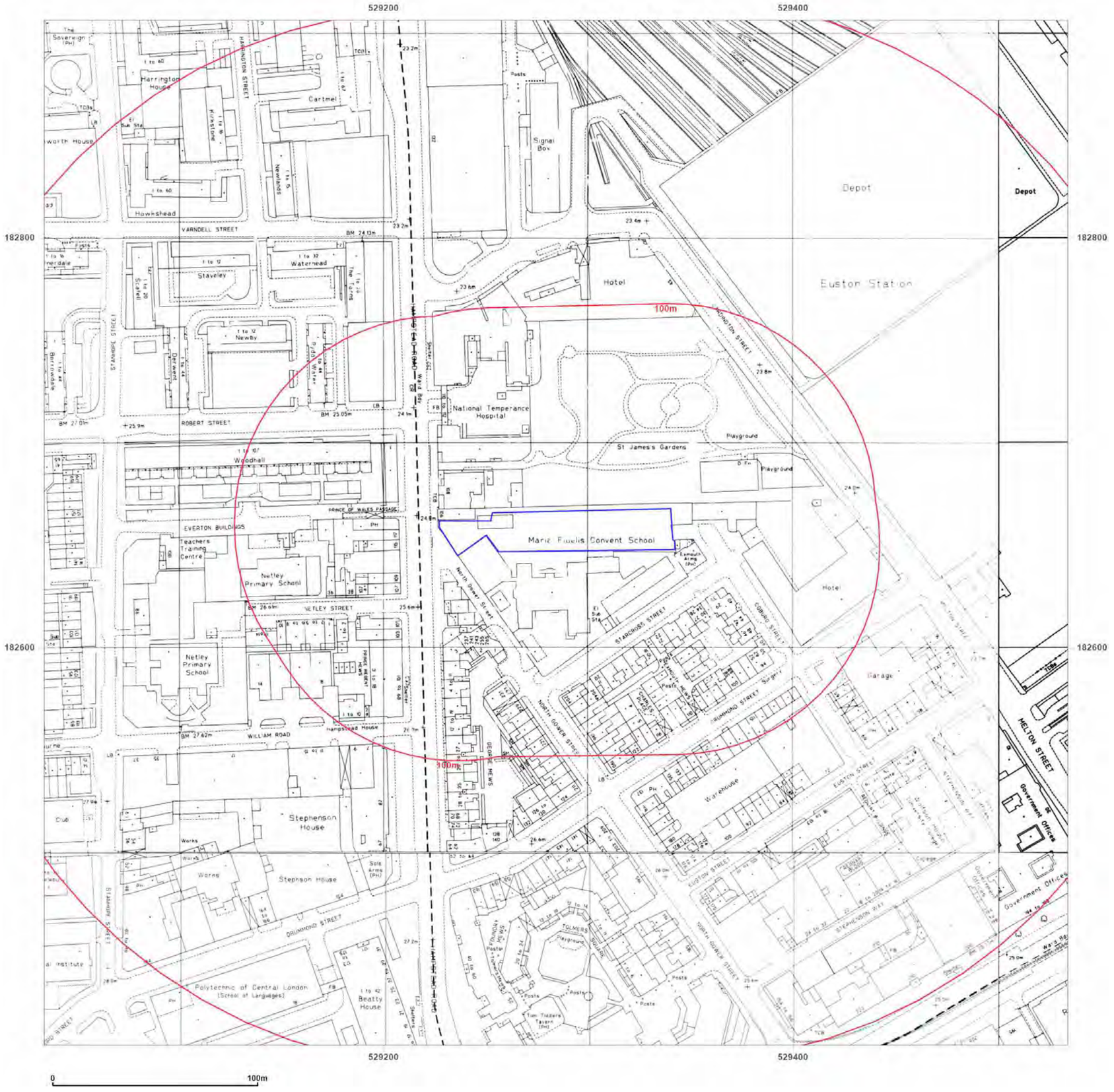

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1991-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed N/A Revised N/A Edition N/A Copyright 1991 Levelled N/A	Surveyed 1992 Revised 1992 Edition N/A Copyright 1992 Levelled N/A
Surveyed 1991 Revised 1991 Edition N/A Copyright 1991 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A

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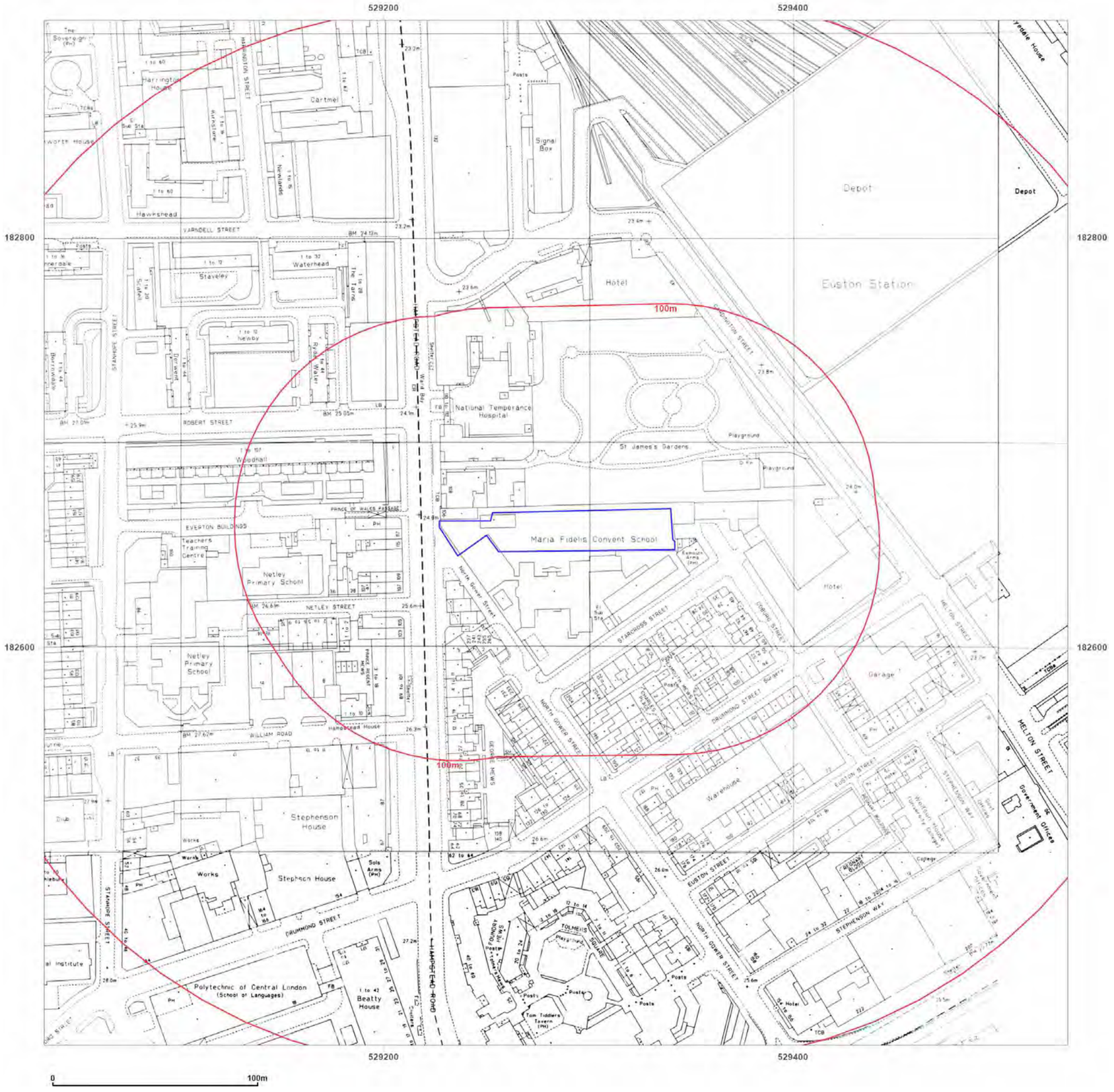

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1991-1993**

Scale: 1:1,250

Printed at: 1:2,000

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Surveyed 1991 Revised 1991 Edition N/A Copyright 1991 Levelled N/A	Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A
Surveyed N/A Revised N/A Edition N/A Copyright 1993 Levelled N/A	

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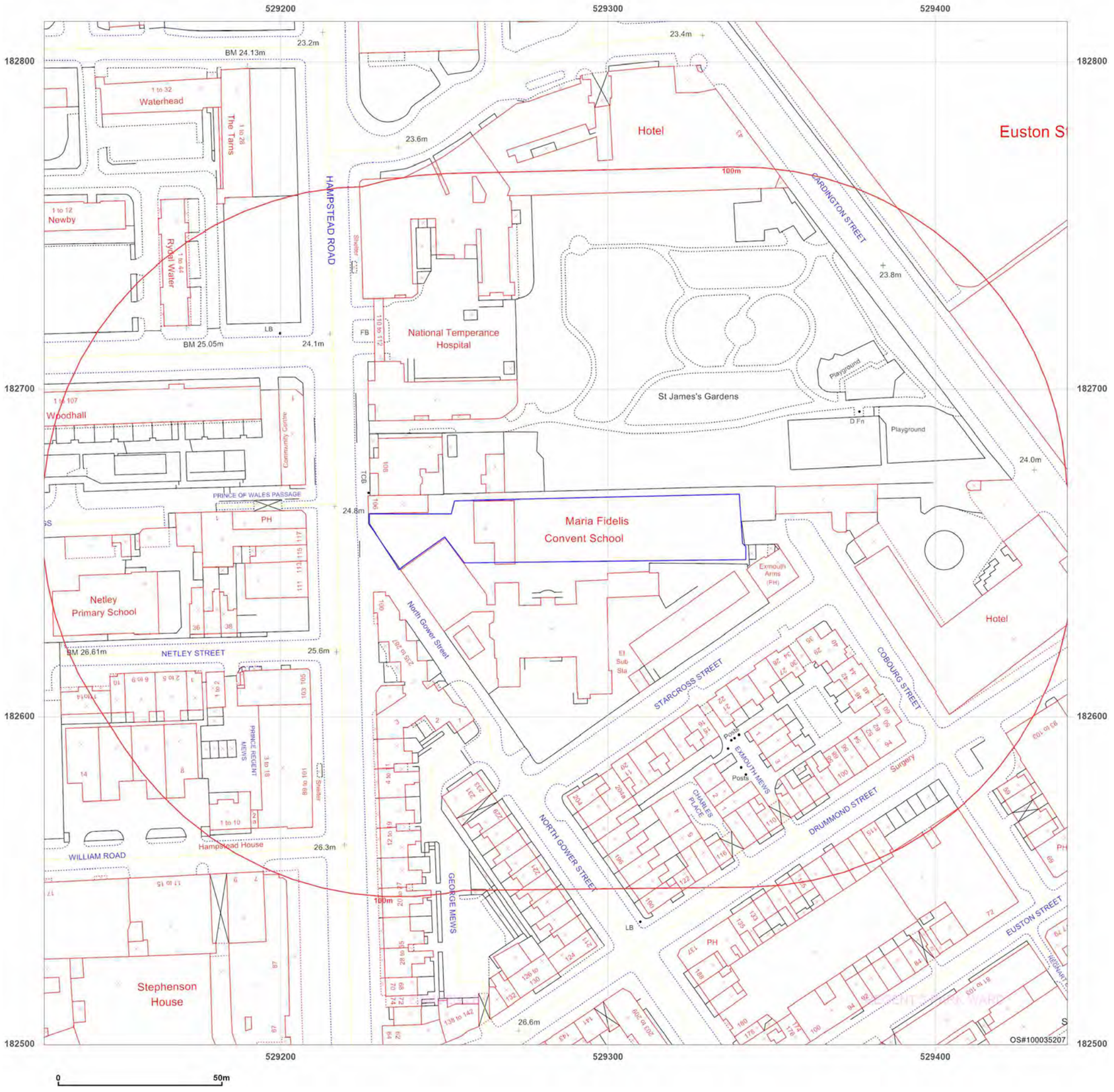

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: LandLine
Map date: **2003**
Scale: 1:1,250
Printed at: 1:1,250

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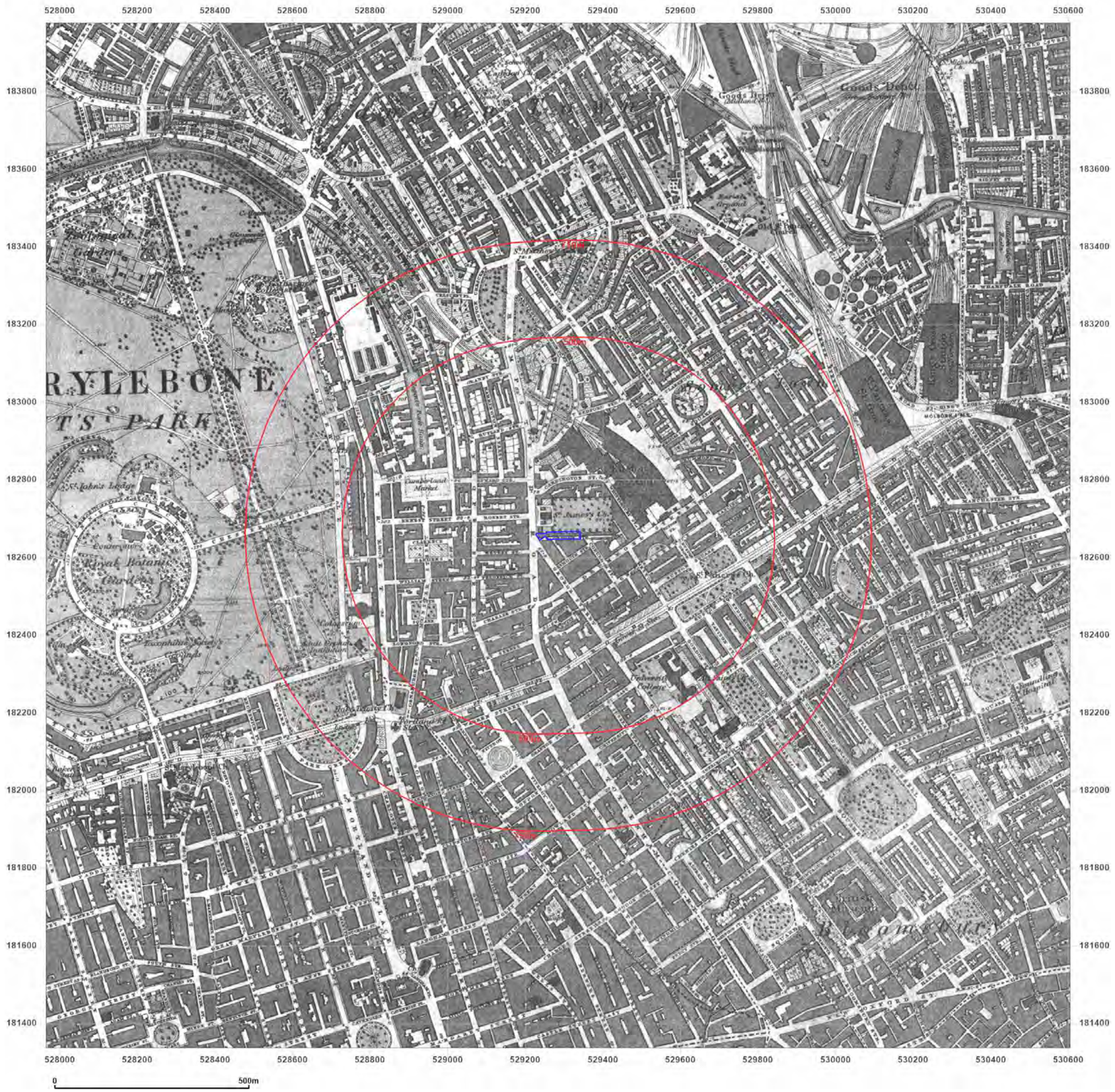

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: County Series

Map date: **1882**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1873
Revised 1873
Edition 1882
Copyright N/A
Levelled N/A

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Production date: 11 March 2021

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Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
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LONDON, NW1 2LY

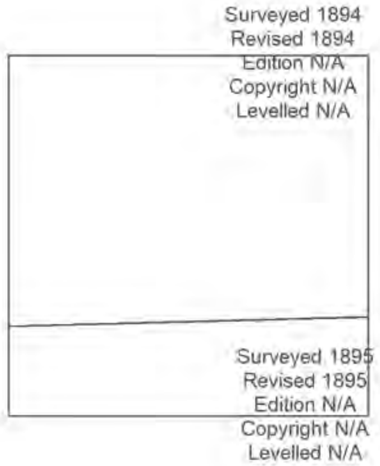
Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: County Series

Map date: **1894-1895**

Scale: 1:10,560

Printed at: 1:10,560



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Production date: 11 March 2021

Map legend available at:
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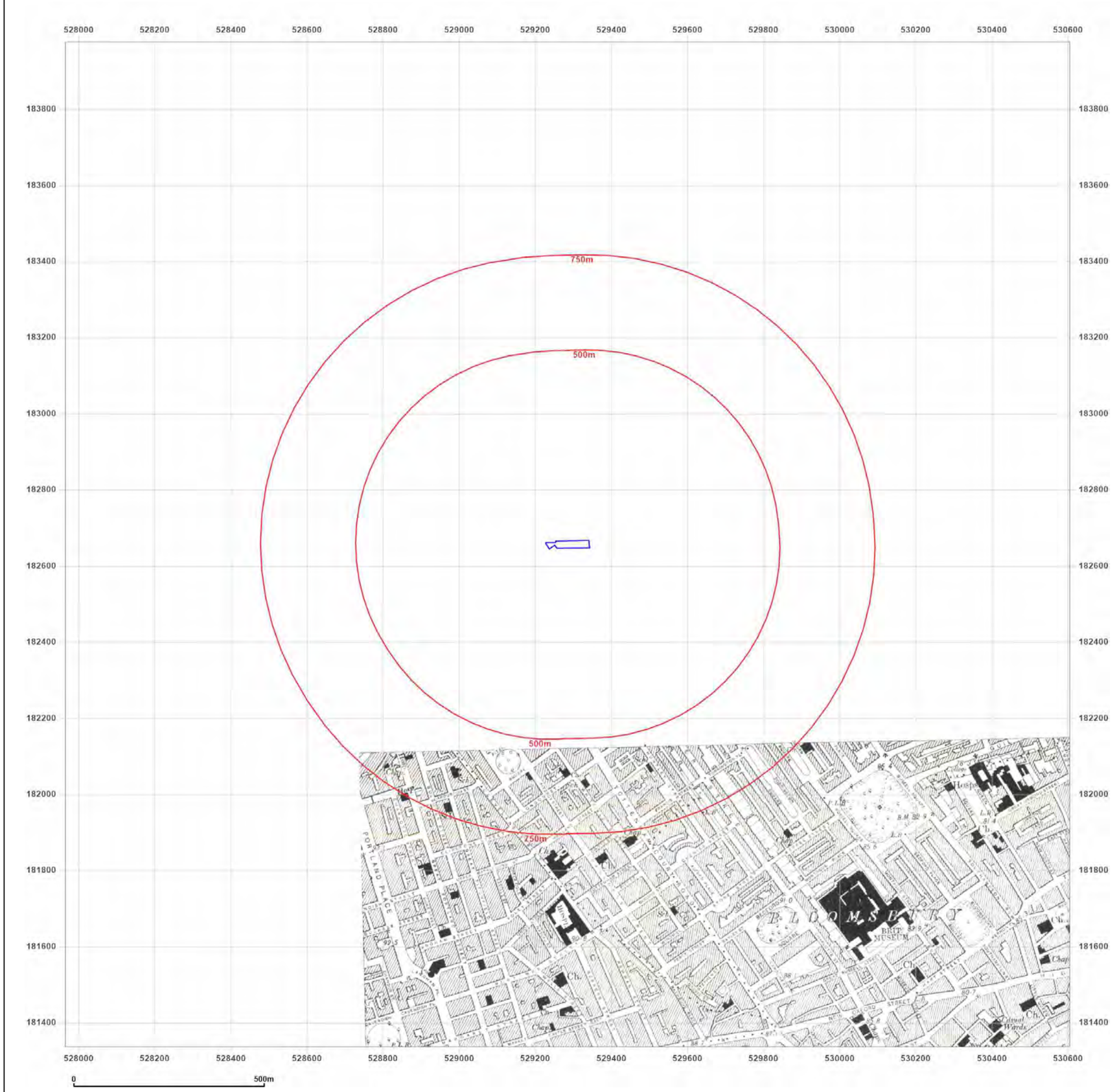

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: County Series
Map date: **1895**
Scale: 1:10,560
Printed at: 1:10,560

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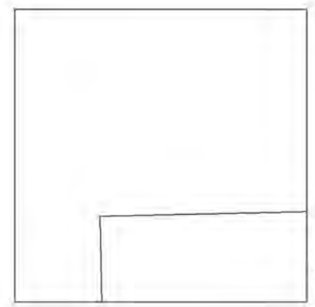

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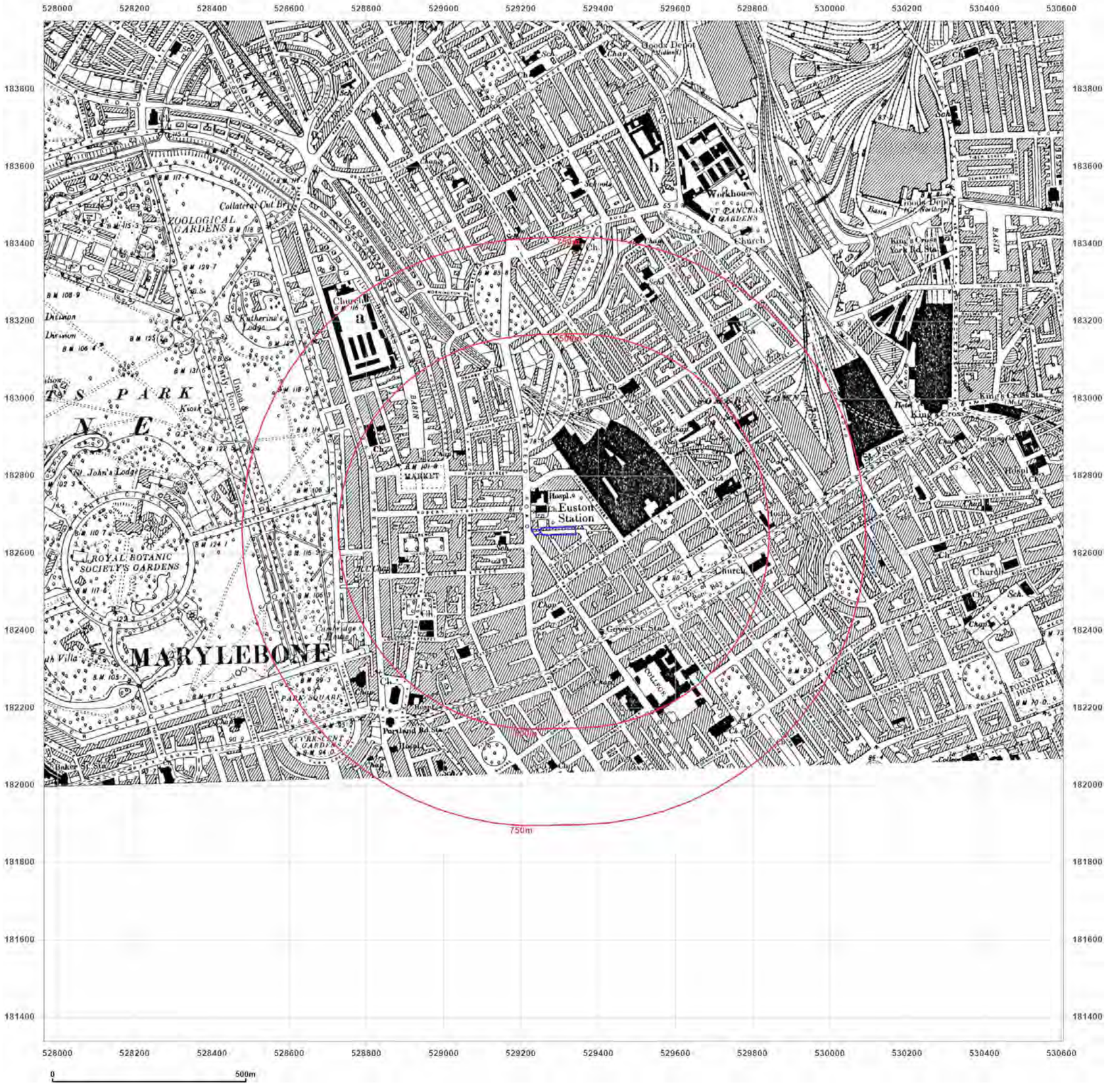
Production date: 11 March 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: County Series

Map date: **1896**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1871
Revised 1894
Edition 1896
Copyright N/A
Levelled N/A

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Production date: 11 March 2021

Map legend available at:
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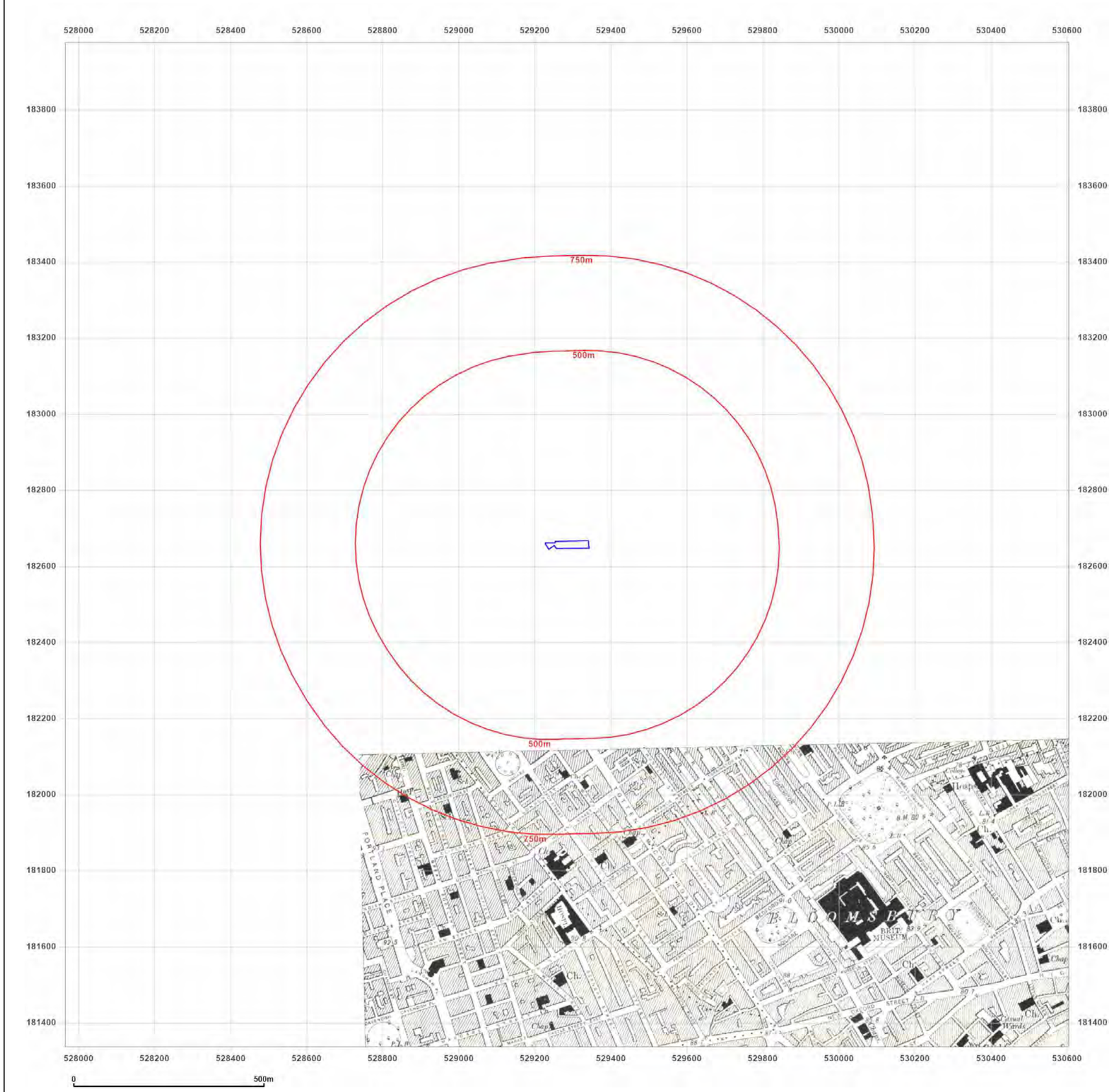

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: County Series

Map date: **1898**

Scale: 1:10,560

Printed at: 1:10,560

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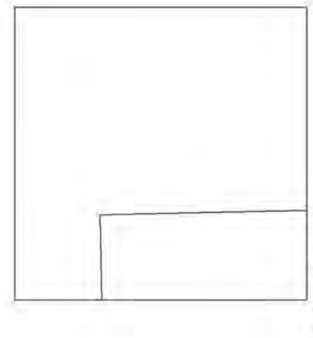

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W: www.groundsure.com

Production date: 11 March 2021

Map legend available at:
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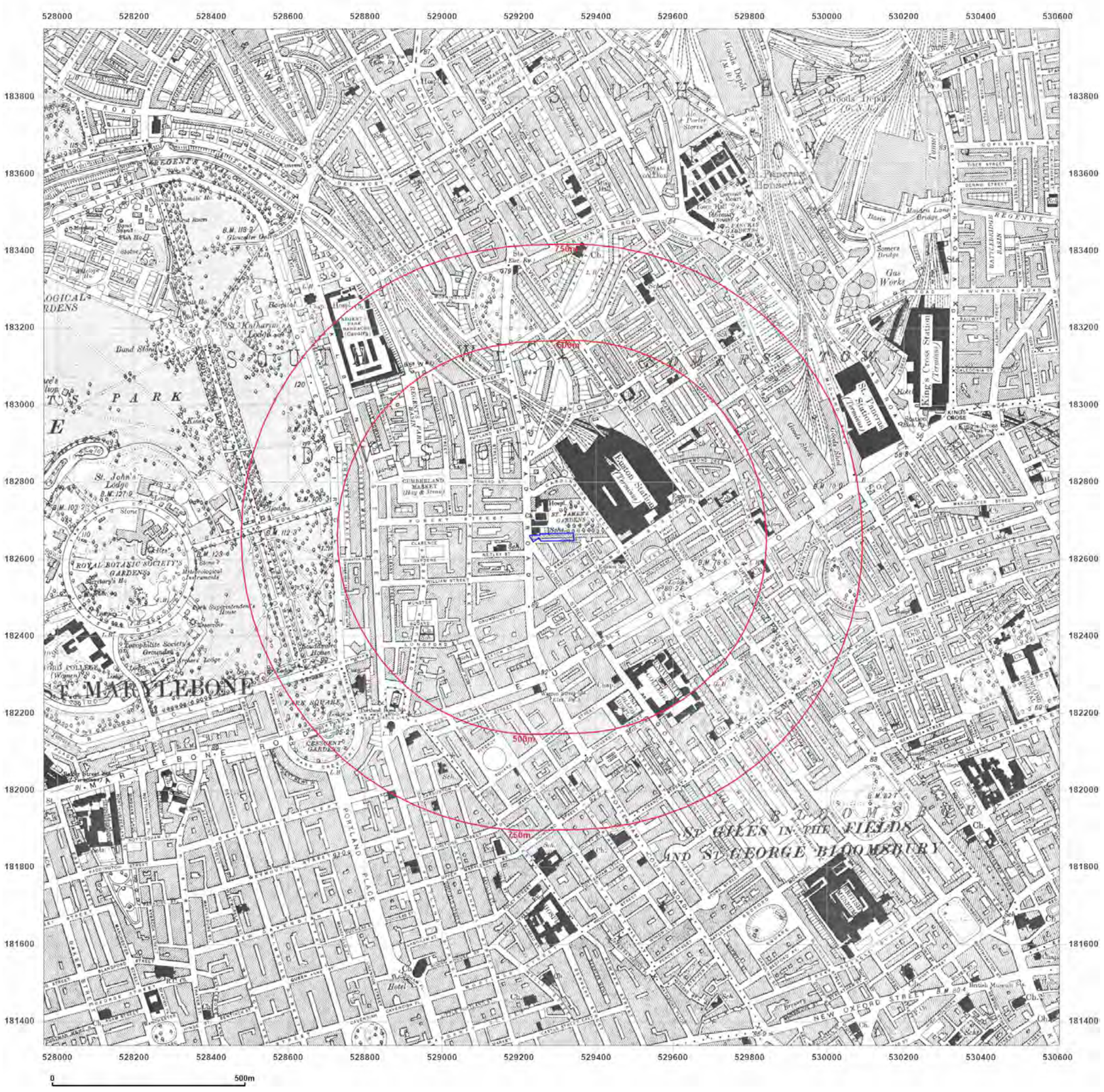

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: County Series

Map date: **1920**

Scale: 1:10,560

Printed at: 1:10,560

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Surveyed 1872
Revised 1919
Edition 1920
Copyright N/A
Levelled N/A

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Production date: 11 March 2021

Map legend available at:
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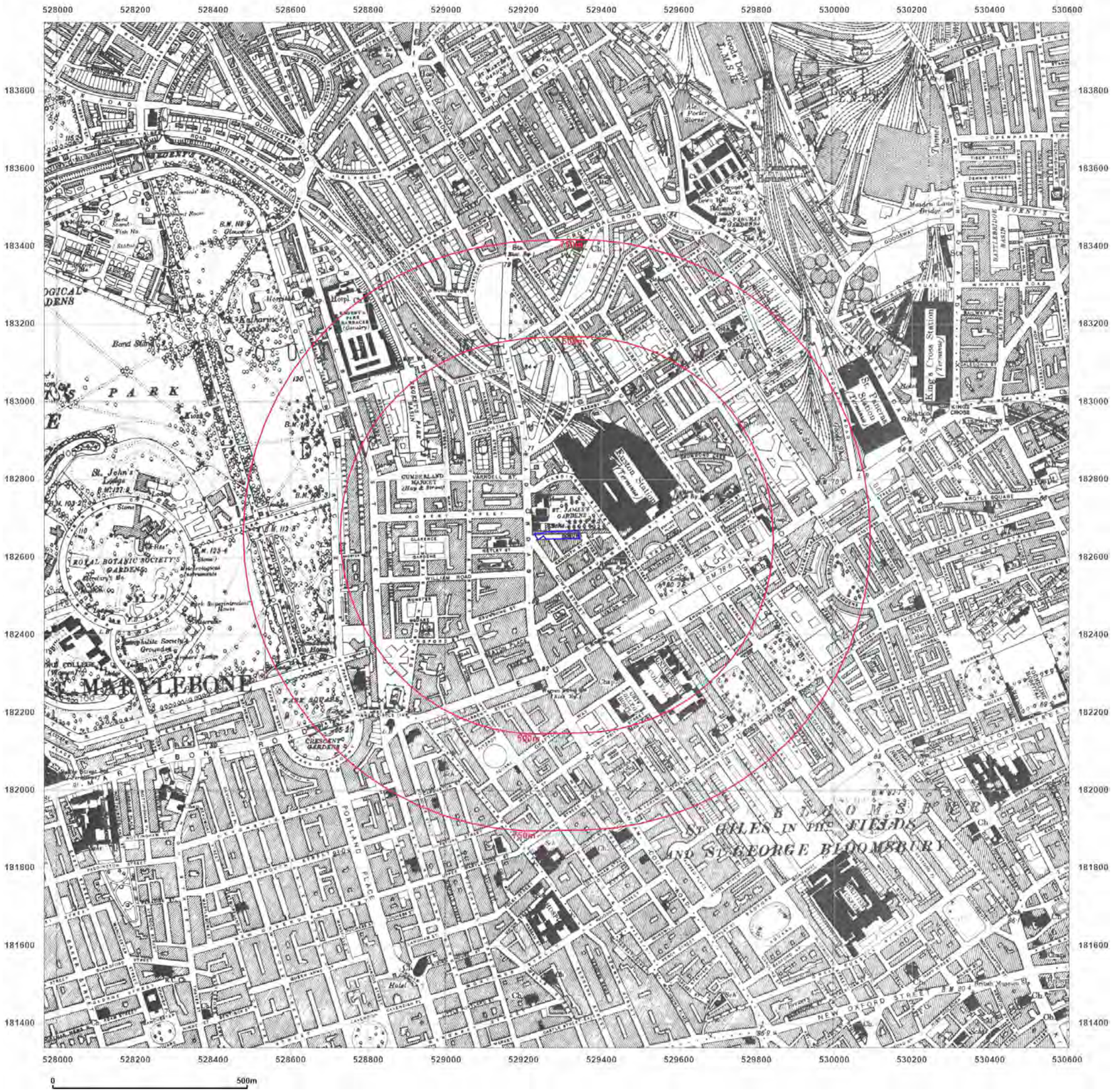

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: County Series

Map date: **1938**

Scale: 1:10,560

Printed at: 1:10,560

N
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Surveyed 1872
Revised 1938
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 11 March 2021

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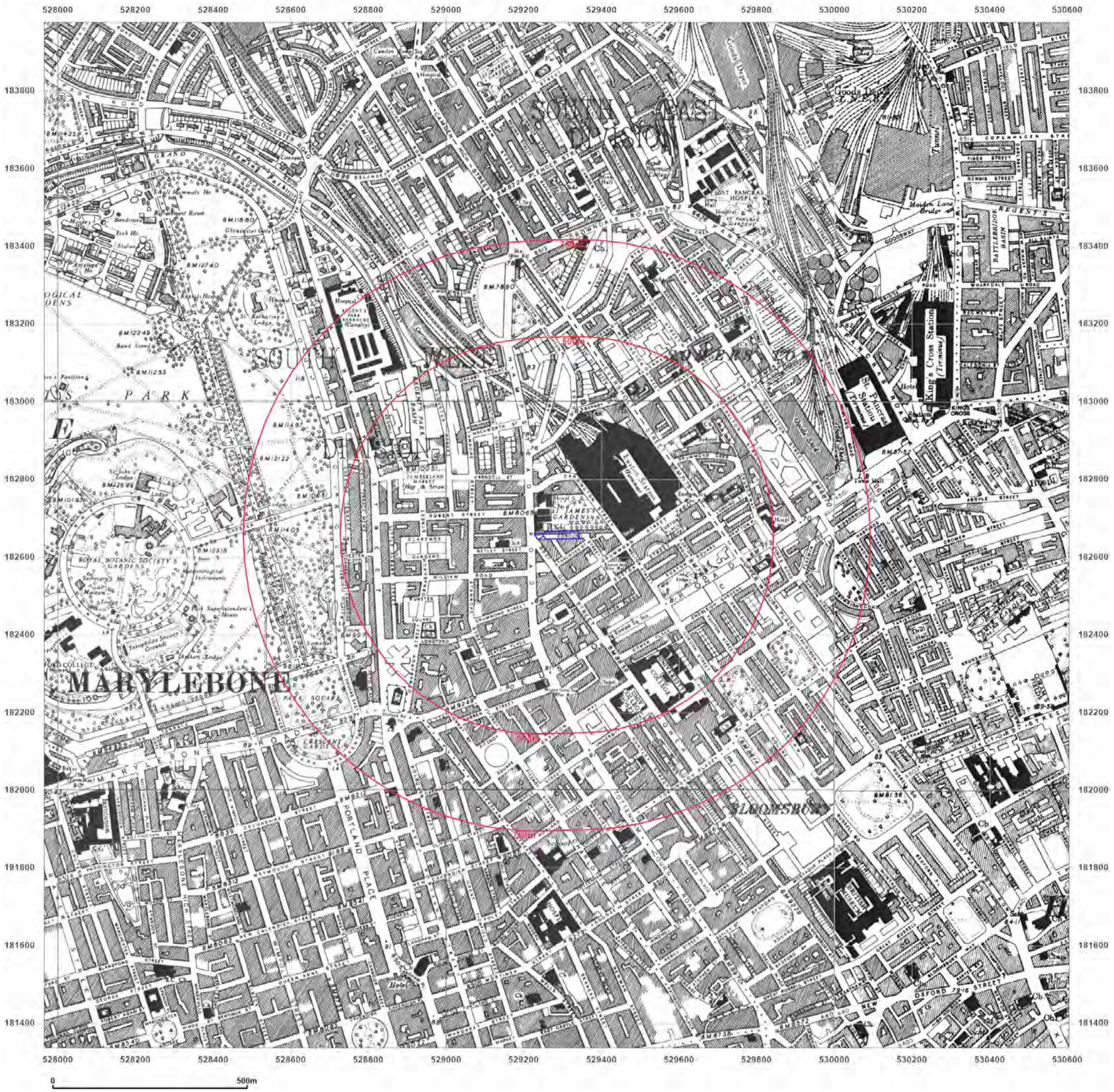

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: Provisional
Map date: **1948-1951**
Scale: 1:10,560
Printed at: 1:10,560

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Surveyed N/A
Revised 1949
Edition N/A
Copyright 1951
Levelled N/A

Surveyed N/A
Revised 1948
Edition N/A
Copyright N/A
Levelled N/A

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Production date: 11 March 2021

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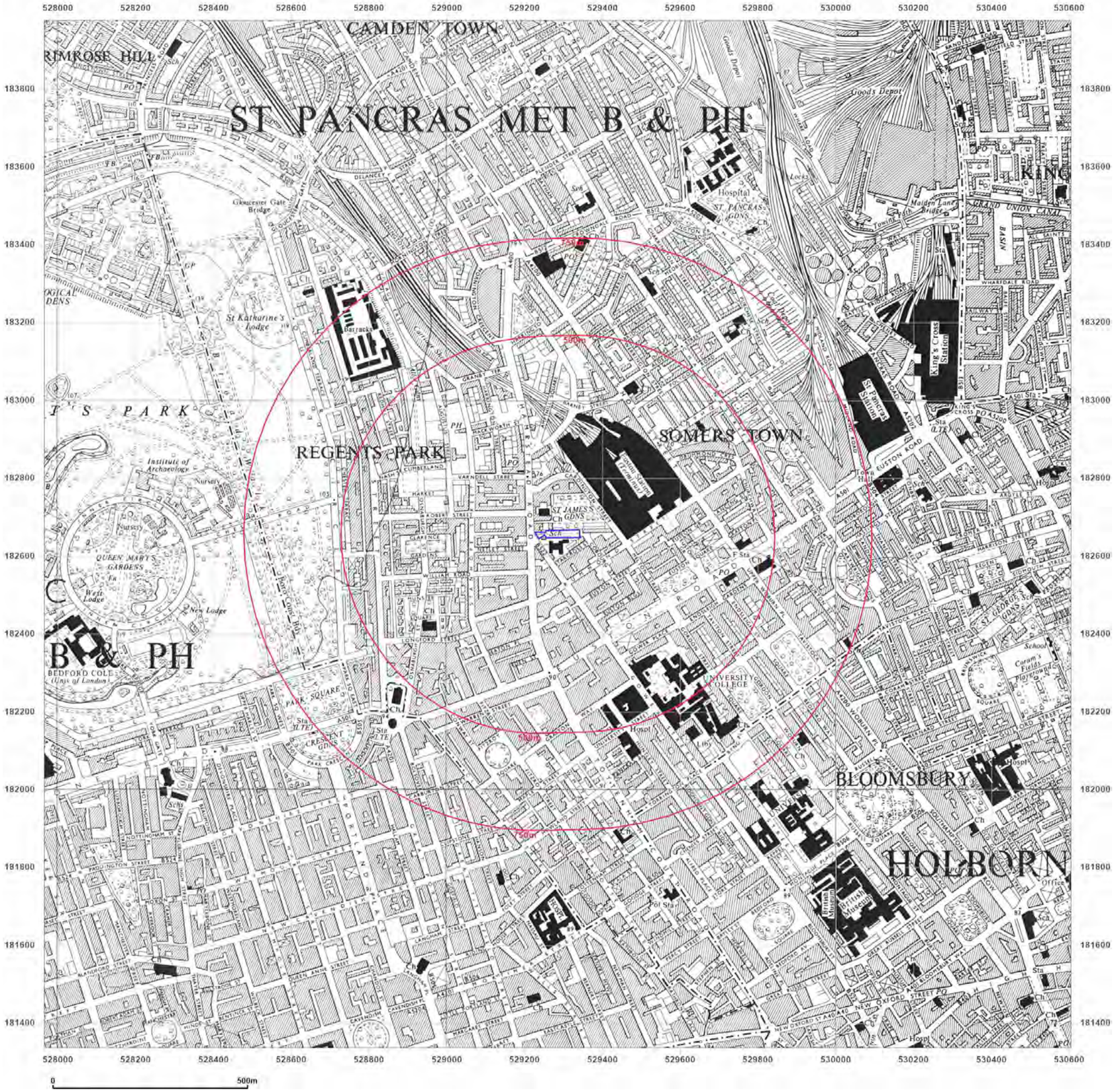

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: Provisional
Map date: **1957**
Scale: 1:10,560
Printed at: 1:10,560

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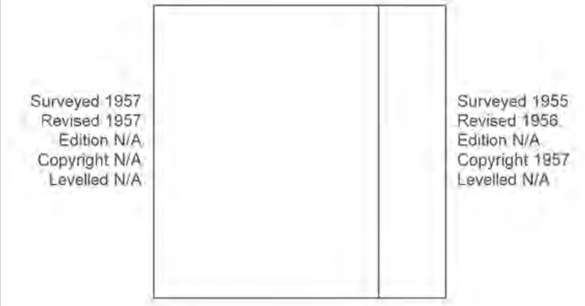

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Map legend available at:
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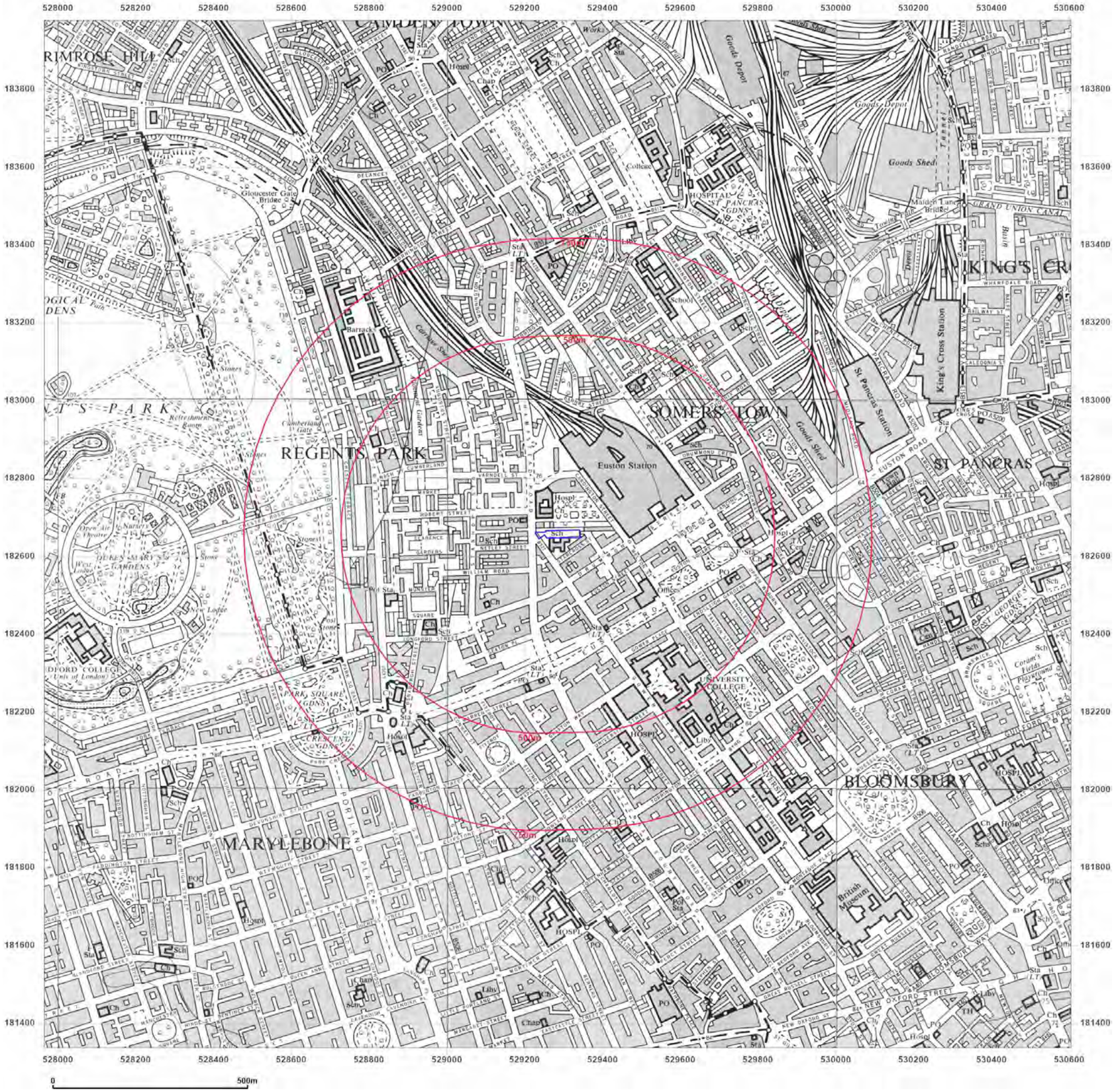

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: Provisional

Map date: **1966-1968**

Scale: 1:10,560

Printed at: 1:10,560

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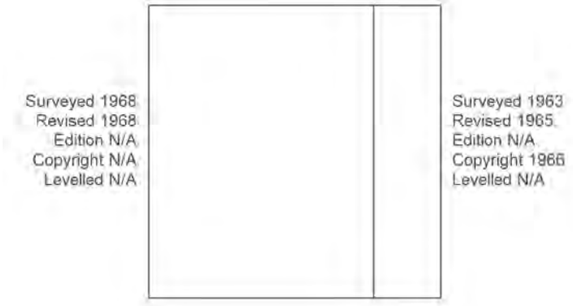

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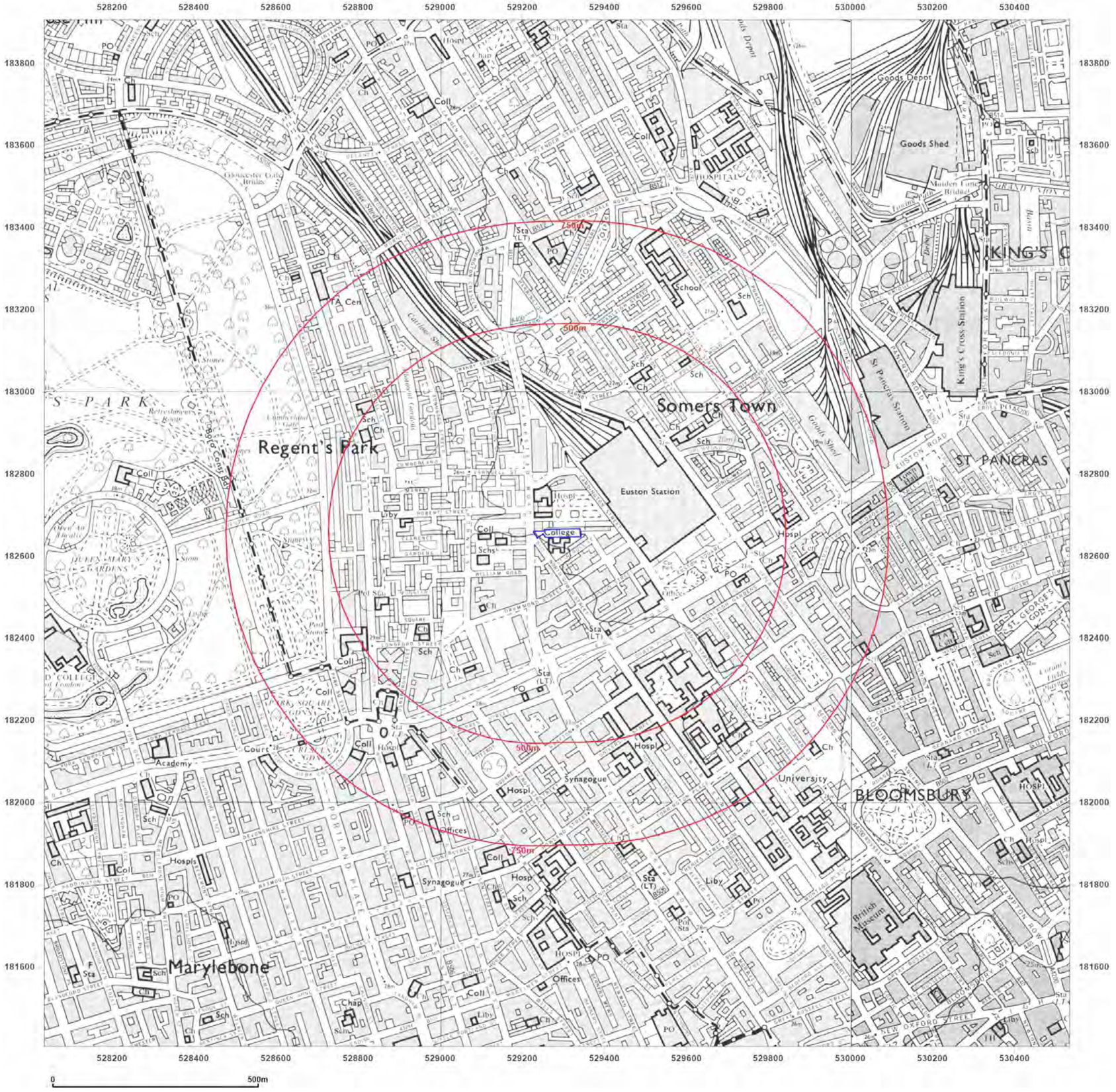
Production date: 11 March 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1971-1973**

Scale: 1:10,000

Printed at: 1:10,000

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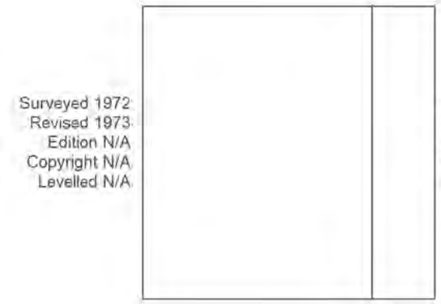

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W: www.groundsure.com

Production date: 11 March 2021

Map legend available at:
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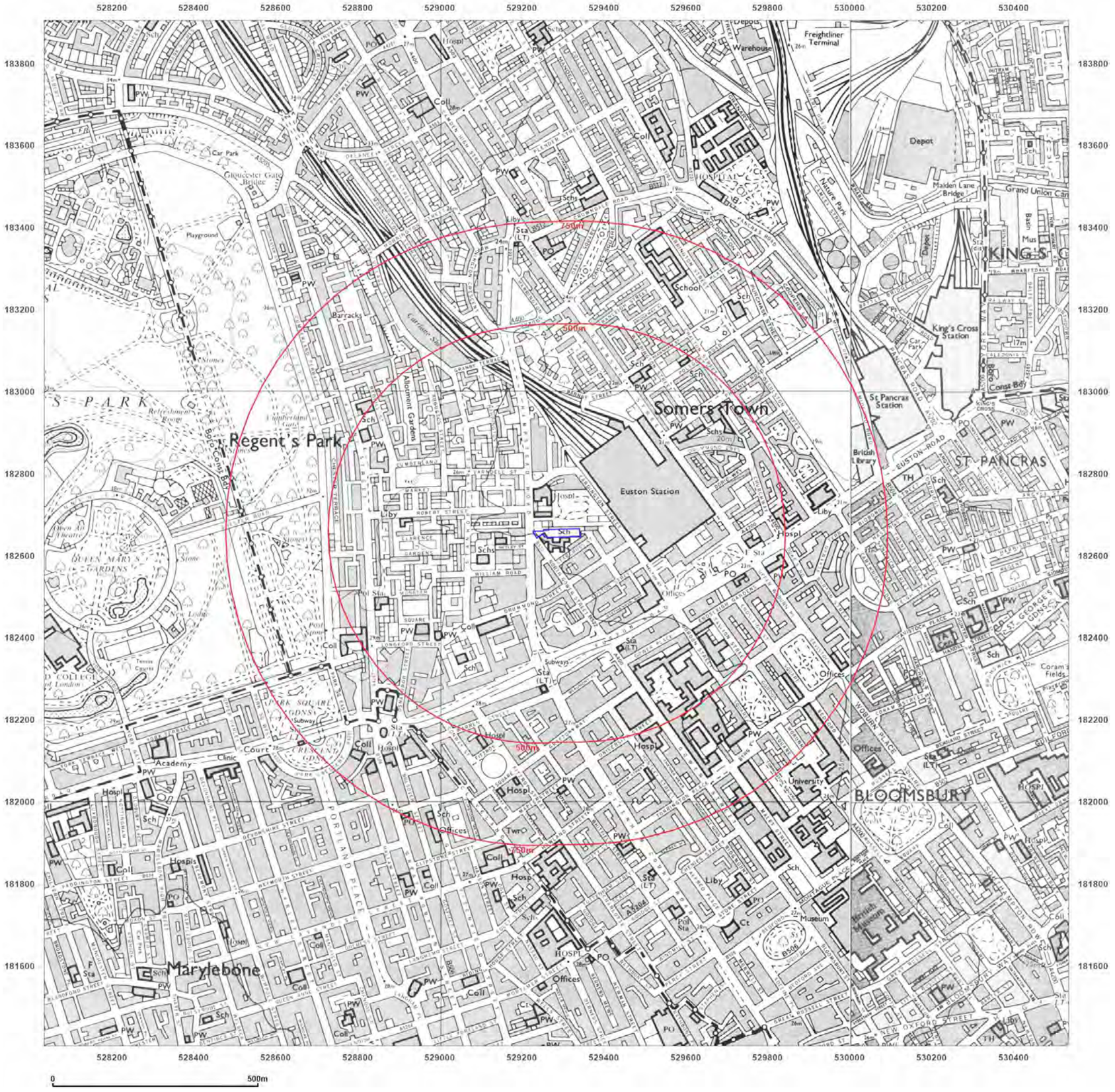

Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **1989-1994**

Scale: 1:10,000

Printed at: 1:10,000

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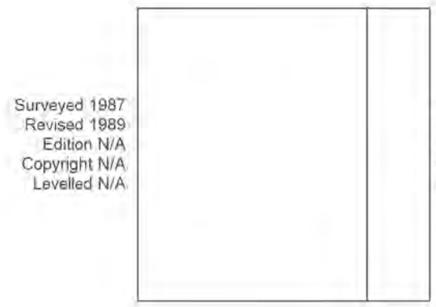

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Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **2001**

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 11 March 2021

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Groundsure INSIGHTS

Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **2010**

Scale: 1:10,000

Printed at: 1:10,000

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2010

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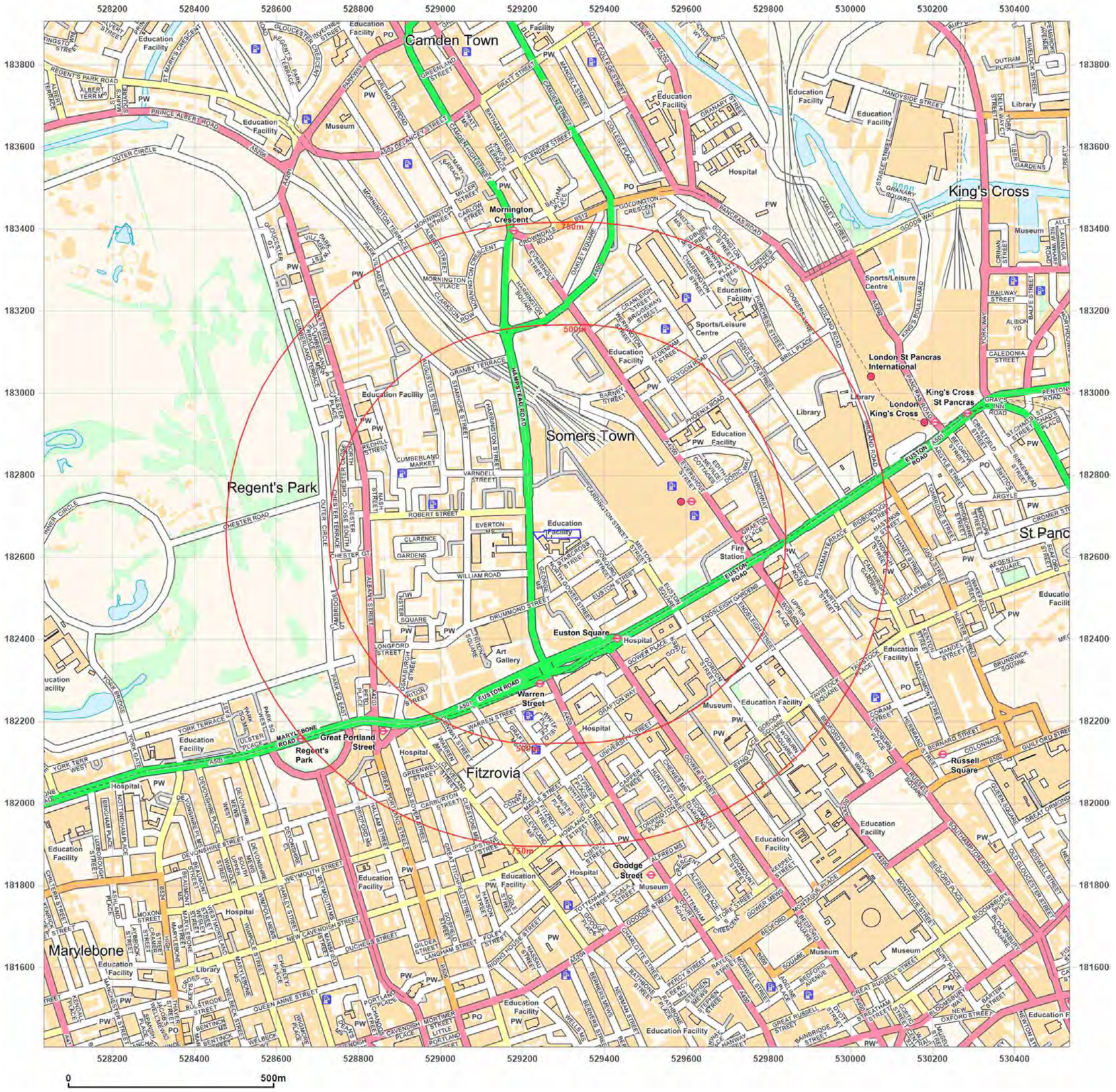
W: www.groundsure.com

Production date: 11 March 2021

Map legend available at:
www.groundsure.com/sites/default/files/groundsure_legend.pdf



Site Details:

MARIA FIDELIS SCHOOL,
NORTH GOWER STREET,
LONDON, NW1 2LY

Client Ref: 260294-00
Report Ref: GS-7650795
Grid Ref: 529284, 182656

Map Name: National Grid

Map date: **2021**

Scale: 1:10,000

Printed at: 1:10,000

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Production date: 11 March 2021

Map legend available at:
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Appendix C1: Ground Engineering ground investigation report

1CP01-MDS_ARP-EV-REP-SS08_SL23-990013

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SITE INVESTIGATION REPORT

MARIA FIDELIS LOWER SCHOOL

NORTH GOWER STREET

LONDON NW1

Report Reference No. C14593

On behalf of:-

Camden Council
c/o Conisbee
1-5 Offord Street
London
N1 1DH

December 2018

CAMDEN COUNCIL

CONISBEE

CONSULTING ENGINEERS

SITE INVESTIGATION REPORT

MARIA FIDELIS LOWER SCHOOL

NORTH GOWER STREET

LONDON NW1

Report Reference No. C14593 **December 2018**

INTRODUCTION

The client, Camden Council, intend to redevelop the Maria Fidelis Lower School site on North Grower Street, London NW1. The proposed redevelopment works are understood to include the conversion and alteration of the main school building into offices, the construction of a new two-storey training centre and the addition of a lift to the main building.

Ground Engineering Limited was instructed by the client, under the direction of consulting engineers, Conisbee, to carry out a site investigation, comprising a desk study and ground investigation. The ground investigation was to determine the nature and geotechnical properties of the underlying soils in relation to foundation design and construction of the redevelopment. In addition, a contamination assessment was to be included within the scope of this investigation.

LOCATION, TOPOGRAPHY, GEOLOGY AND HYDROGEOLOGY

Maria Fidelis Lower School is located off the north-eastern side of North Gower Street, 80m west of Euston railway station and 500m east of The Regentôs Park, London NW1. The site is centred at National Grid Reference TQ 2928 8264. A site plan is presented at the rear of this report, and an aerial photograph and site location plan are presented on the front page of Section 1 of the environmental searches report in Appendix 2.

The approximately triangular shaped site extends for 80m along the north-eastern side of North Gower Street and 85m along the northern side of Starcross Street. The site is bound to the east by The Exmouth Arms public house, and to the north by construction works for the High Speed One (HS1) expansion to Euston railway station.

At the time of the investigation the site was occupied by several buildings, including the two/three-storey main school building, a two-storey high gymnasium, a two-storey school building and a single-storey school building. There were also some single-storey plant buildings and a storage container within the site. The site was surfaced by hardstanding with small peripheral areas of soft landscaping and a small pond in the north-western corner of the site.

The areas of soft landscaping contained Cherry, Elder, Lime, London Plane, Hawthorn, Rowan, Field Maple, Apple and Plum trees.

The site stands at a level of approximately 25mOD on ground that falls gently to the north-east, toward the culverted River Fleet, which flows south-eastwards some 0.8km to the north-east.

The 1935, 1:10,560 scale geological map for the locality, London sheet V.NW, based on the 1920 O.S. map, shows the southern half of the site to be covered by Taplow Gravel and the site to be underlain by the solid geology of the London Clay. A borehole record 100m south-west of the site shows the London Clay from 6.70m depth, and the Chalk at about 56m below ground level.

The 2006 geological map for the area at 1:50,000 scale, Sheet 256, shows most of the site to be covered by the Langley Silt or Lynch Hill Gravel (previously Taplow Gravel) and underlain by the solid geology of the London Clay. Areas of worked ground were shown to the east and to the north-west. The Environment Agency classifies the Langley Silt and London Clay as Unproductive strata, and the Lynch Hill Gravel is designated as a Secondary A Aquifer. The direction of surface water and groundwater flow would be expected to be toward the north-east and the River Fleet.

HISTORY OF THE SITE

Historical maps dating from 1747 have been sourced by Ground Engineering Limited and reviewed as part of this desk study, together with aerial photographs and internet searches. Selected map extracts are reproduced in Appendix 1.

Map Extract Studied	*Description*
1747 J. Rocqueôs Plan of the Cities of London & Westminster Not to Scale **Figure A**	The site was within an area of open fields on the eastern side of the Road to Highgate. Several ponds/flooded gravel pits and allotments were shown to the south around Tottenham Court.
1802 J. Fairburnôs Map of London & Westminster Not to Scale **Figure B**	The site was located within a field directly south of St. Jamesô Burying Ground. The St. Pancras School and Georges Street were shown directly west of the site. New residences had been built to the east, west and south-west of the site. The ponds had been backfilled, apart from one to the south that had been made into a reservoir.
1813 R. Horwoodôs Plan of London Not to Scale **Figure C**	The site was unchanged. Extensive residential development had occurred to the west of the site.
1827 Greenwoodôs Map of London Not to Scale **Figure D**	The site was now occupied by terraced housing and additional residential development had continued in the surrounding area.
1834 Map of St. Marylebone (Not Reproduced)	The site was as before, and the field to the north was outlined for additional residential development.
1862 Stanfordôs Library Map of London and its Suburbs Not to Scale **Figure E**	The site was unchanged. A railway station, Euston station, had been built to the west of the site, the terminus for the railway that led to the north. The surrounding area was fully developed, mostly by dwellings.
1873 Town Plan Scale 1:1056 **Figure F**	The site was shown in detail for the first time and densely occupied by terraced residences with small rear gardens and included two roads, Little George Street and Little Exmouth Street. The surrounding area remained as densely packed terraced housing and industry to the east, west and south. The Burial Ground to the north was labelled as disused.
1896 Town Plan Scale 1:1056 **Figure G**	The site was unchanged. The burial garden to the north had been renamed St. Jamesôs Gardens. A smithy was shown 32m to the south-east, surrounded by residences around Charles Place.

1916 London Sheet V.5 1:2500 **Figure H**	The site was as before, although Little George Street had been renamed Coburg Street. Euston station had been expanded to the north-west and replaced the north-western corner of St. Jamesôs Gardens. A printing works was also shown to the north, adjacent St. Jamesôs Gardens.
1939-45 L.C.C. Bomb Damage Map Not to Scale **Figure I**	Most of the dwellings and Little Exmouth Street had been replaced with a large school building with several smaller ancillary buildings. These buildings had sustained minor blast damage and were shown to be scheduled for clearance. The surrounding area had suffered had sustained considerable bomb damage, including a V1 flying bomb strike to the north-east. Areas that were seriously damaged, damaged beyond repair or totally destroyed were shown to surround the site, with the closest to the south-west on the south-western side of Georges Street.
1940s Aerial Photograph **Figure J**	The site is dominated by a large central building surrounded by hardstanding and with smaller ancillary buildings along Georges Street. Terraced dwellings were located along the northern and western parts of the site. Several ruins and cleared areas were shown in the predominantly residential surrounding area. St. Jamesôs Gardens, to the north, contained soft landscaping and numerous trees.
1951-52 OS Sheets TQ2982NW & TQ2982SW 1:1250 **Figure K**	The houses along the northern edge of the site had been cleared. Georges Street had been renamed Gower Street and Exmouth Street was now called Starcross Street. Two hospitals were shown to the north-west; an electricity sub-station to the east; a chemical works and engineering works to the south-east, and cleared areas and ruins in the area formerly shown as totally destroyed to the south-west.
1959-62 OS Sheets TQ2982NW & TQ2982SW 1:1250 **Figure L**	One of the smaller buildings within the north-western corner of the site had been removed, as had the remnants of Coburg Street. The site had been named as Starcross Secondary School. The terraced dwellings along the south-western side of the site had been replaced by a single long school building. An additional ruin was shown to the south-west of the site, adjacent the previously cleared area. A surgery was also shown 25m to the south on the north-eastern site of Gower Street.
1970 OS Sheet TQ2982 1:2500 **Figure M**	An electricity sub-station was marked within the centre of the south-western boundary of the site, which was named as Princeton College. The chemical/engineering works to the south-west was in use as a warehouse. A garage was shown 80m to the south-west of the site.
1985-86 OS Sheets TQ2982NW & TQ2982SW 1:1250 **Figure N**	Two new buildings had been constructed within the north-western part of the site, which had been renamed as Maria Fidelis Convent School. Residential redevelopment had occurred to the south-west and south-east with the demolition of terraced dwellings and warehouses, and the construction of new maisonettes. The church, formerly associated with the burial ground to the north, had been demolished and the nearby hospital had expanded into its former location.
1991 OS Sheets TQ2982NW & TQ2982SW 1:1250 **Figure O**	The site and surrounding area were unchanged.
2002 OS Raster Map 1:10,000 **Figure P**	A new building had been constructed in the north-western part of the site, replacing a building constructed there in the 1970s/early 1980s. The surrounding area remained apparently unchanged.

2014 OS Sheet TQ28NW 1:10,000 **Figure Q**	The site and surrounding area appeared as before.
2015 Aerial Photograph presented page 1 of Environmental Searches Report, Appendix 2	The site was shown occupied by school buildings and covered by hardstanding, including playgrounds. The surrounding area was much as before, with residences, warehouses and Euston station to the north-east. The area contained more vegetation than shown in the 1940s aerial photograph.
2017-2018 Internet Research	St. Jamesôs Gardens to the north had been excavated and approximately 60,000 bodies exhumed as part of the construction works for HS2.
2018 (assumed) BT plan Not to Scale **Figure R**	The site and surrounding area were mostly unchanged, with minor alterations and extensions. The nearby St. Jamesôs Gardens were still shown, although this area was now a construction works for the expansion of Euston station.

The site occupied part of a field since before 1747 until terraced dwellings were constructed upon it in the early 19th Century. Many of these houses were subsequently demolished in the 1920s or 1930s and a school was constructed upon the site. Following minor blast damage sustained in World War II, the remaining houses within the site were demolished, and the school expanded, including the installation of an electricity sub-station, during the 1950s. Two new buildings was constructed in the 1970s/80s in the north-west of the site, one of which was subsequently replaced in the 1990s.

The surrounding area comprised fields in 1747, but was rapidly developed with residences over the late 18th and early 19th Centuries. A burial ground was present immediately north of the site, but was disused by the latter part of the 19th Century and subsequently was changed to a public park. The completion of residential development coincided with the construction of Euston station in the mid-19th Century. The surrounding area sustained damage during World War II, but this did not change the nature of the area, which remained predominantly residential. In 2017 work began on the expansion of Euston Station within the grounds of St. Jamesôs Gardens to the north.

ENVIRONMENTAL SEARCHES

Appendix 2 contains information derived from Environmental Databases for a radius of up to 250m from the site. The information contained includes data sets held by Landmark Information Group and contributors include the Environment Agency, Local Authority, British Geological Survey, Ordnance Survey, English Nature and the Coal Authority.

The results obtained within 250m of the site are presented in summary form together with a detailed search on selected areas of enquiry based on the summary details.

Historical Land Use

Details on historic industrial sites in the surrounding area are presented in Section 1 of the Environmental Searches Report in Appendix 2. In summary, there are no (0) records of historical industrial uses listed for the site address. Thirty-eight (38) records are listed within 250m of the site and relate to: hospitals, the closest 26m to the north, the remainder are for railway stations and railway sidings between 77m and 246m north, north-east, east, south-east and south of the site.

There are five (5) records for historical tanks within 250m of the site, the closest was 155m to the south. There are four (4) listings for energy features within the site address; these are all for electricity sub-stations. There are also twelve (12) additional electricity sub-stations recorded within 250m of the site, the closest 11m to the east. There are seventeen (17) records from the Historical Garage and Motor Vehicle Repair Database listed within 250m of the site; the closest of these for garages 27m to the north-east of the site. There no (0) historical petrol/fuel sites, military sites or areas of potentially infilled land listed within 250m of the site.

Environmental Permits, Incidents & Registers

The following is a summary of the main points for environmental authorisations:

Statutory Authorisations

IPC & IPPC Regulations: There are no (0) recorded sites authorised by the Environment Agency under Part I of the Environmental Protection Act 1990, to carry out processes subject to Integrated Pollution Control (IPC) or Integrated Pollution Prevention and Control (IPPC) on, or within 250m of the site. There are no (0) recorded IPC Registered Waste Sites on, or within 250m of the site.

Keeping of Dangerous Substances: There are no (0) Environment Agency List 1 or 2 Dangerous Substance Inventory Sites listed within 250m of the site.

Enforcement Notices and Authorised Processes: There is a single (1) Part A(1) or Part B activity recorded by the Environment Agency under Part I of the Environmental Protection Act 1990 within 250m of the site. This is for a revoked permit for a Part B activity (unloading of petrol into storage at service stations) at BP Euston, 127m north-west of the site.

Keeping of Radioactive Substances: There are eleven (11) recorded sites registered by the Environment Agency under the Radioactive Substances Act 1993, within 250m of the site. These are all for a hospital 31m north and include effective, superseded by variation and revoked permits for the keeping and use of radioactive materials, and the disposal of radioactive waste.

Discharge Consents

Red List Discharge Consents: There are no (0) consents issued for potentially harmful discharges to controlled waters on or within 250m of the site.

Licensed Discharge Consents: There are no (0) recorded discharge consents within 250m of the site.

Water Industry Referrals: There are no (0) Water Industry Referrals recorded within 250m of the site.

Storage of Hazardous Substances

Storage of Hazardous Substances: There are no (0) recorded sites subject to hazardous substances consents granted by the relevant local authority under the Planning (Hazardous Substances) Act 1990 on, or within 250m of the site.

COMAH and NIHHS Sites

Control of Major Accidents: There are no (0) recorded sites regulated by the Health and Safety Executive under the Control of Major Accident Hazards (COMAH) regulations 1999, on, or within 250m of the site.

Notification of Installations Handling Hazardous Substances: There are no (0) sites within 250m of the site regulated by the HSE under the Notification of Installations Handling Hazardous Substances (NIHHS) regulations.

Pollution Incidents

Pollution Incidents and Prosecutions: There is a single (1) pollution incident recorded within 250m of the site. This is for a diesel spill 212m east of the site in July 2001, with no impact on water, land or air.

Contaminated Land Register Entries & Notices: There are no (0) recorded entries or notices on the Contaminated Land Register listed on, or within 250m of the site.

Landfill & Waste Sites

The following is a summary of the main points for the Waste section:

Landfill Sites: There are no (0) recorded landfill sites licensed by the Environment Agency under Part II of the Environmental Protection Act 1990, within 250m of the site.

Historic Landfill Sites: There are no (0) recorded historic landfill sites recorded on or within 250m of the site.

Registered Landfill or Local Authority Recorded Landfill Sites: There are no (0) recorded operational or non-operational landfills located on or within 250m of the site.

Waste Treatment, Transfer and Disposal: There are no (0) record of waste treatment, transfer or disposal sites within 250m of the site.

Potentially Contaminative Uses

Current Industrial Sites: There is a single (1) recorded potentially contaminative use listed for the site address and twenty-two (22) recorded within 250m of the site. The potential contaminated use listed for the site is for an electricity sub-station. The potential contaminated uses listed within 250m of the site are for: four (4) electricity sub-stations; two (2) offices of plastic product manufacturers/recyclers, two (2) transport, storage and delivery services; two (2) vehicle hire and rental services; a scaffolder, a second hand vehicle dealership, a former photography shop, a railway station, a medical health centre, a security system service, a publisher, a depot, a recording studio, a vehicle parts and accessories provider, an underground station and a provider of consumer products.

Petrol and Fuel Sites: There are no (0) petrol and fuel filling stations recorded within 250m of the site.

High Voltage Underground Transmission Cables: There are no (0) recorded high voltage underground transmission cables within 250m of the site.

High Pressure Oil & Gas Pipelines: There are no (0) recorded underground high pressure oil and gas pipelines within 250m of the site.

Geology & Hydrogeology – Pathways & Receptors

The following is a summary of the main points for the sensitivity section:

Artificial & Made Ground: The site, including a 50m buffer, is not recorded as being covered by made ground.

Drift Deposits & Solid Geology: The site, including a 50m buffer, is recorded as being covered by the Langley Silt Member and Lynch Hill Gravel Member, and underlain by the solid geology of the London Clay Formation.

Groundwater Vulnerability: The Langley Silt Member and London Clay Formation are designated as Unproductive strata by the EA. The Lynch Hill Gravel Member is designated as a Secondary (A) Aquifer by the EA.

Water Abstractions: There are no (0) recorded water abstraction licences listed on, or within 250m of the site.

Source Protection Zones: The site does not lie within 250m of a Source Protection Zone.

River Quality: There is no (0) Environment Agency information relating to river quality within 250m of the site.

Mastermap Water Network & Surface Water Features: There are no Ordnance Survey MasterMap Water Network entries or surface water features recorded within 250m of the site.

Flood Risk: The site is not within a Zone 2 or a Zone 3 flood plain, and is in an area where there is a ôVery Lowô risk of flooding from rivers and the sea. The site is not within 250m of flood defences, or an area benefitting from flood defences. The site is not within 250m of an area used for flood storage. The site is in an area that is prone to groundwater flooding of the superficial deposits with a potential at surface.

Environmentally Sensitive Receptors

Environmentally Sensitive Areas: There are no (0) environmentally sensitive areas within 250m of the site.

Protected Countryside Areas: There are no (0) National Parks or other protected areas or parks recorded as being either on or within 250m of the site.

Nitrate Vulnerable Zones: The site and surroundings are indicated to not be within a nitrate vulnerable zone.

Natural & Mining Hazards

Natural Subsidence Risk: According to the British Geological Survey there is: a ôModerateô hazard potential for Shrinking and Swelling Clay; a ôLowô hazard potential for Collapsible Rocks; a ôVery Lowô hazard potential for Landslides and Running Sand; and a ôNegligibleô hazard potential for Soluble Rocks and Compressible Ground.

Coal Mining: The site is not within 75m of any areas affected by coal mining.

Non-Coal Mining: The site is not within an area that may have been affected by non-coal mining.

Brine Affected Areas: The site is not within 75m of a brine affected area.

Radon Affected Area: The site lies within an area where less than 1% of properties are above the action level for radon.

Radon Protection Measures: The site lies within an area where no radon protection measures are required for new dwellings or extensions in accordance with Building Research Establishment report BR211 (1999).

UNEXPLODED ORDNANCE RISK ASSESSMENT

Reference to the 1939-45 LCC Bomb Damage Map (Appendix 1, Figure I) shows the site suffered from minor blast damage and was subsequently scheduled for clearance. The large building in the site was not cleared, but the terraced houses were.

The closest V1 flying bomb impacted 250m north-east of the site. Online records (bombsight.org) show the closest high explosive bomb fell immediately south of the site, and a further four (4) were recorded within 50m of the site.

Due to the good records of bomb strikes and the clearance of the terraced housing, it is considered that there is a low risk of encountering unexploded ordnance on this site.

PRELIMINARY RISK ASSESSMENT

In order to assess the risks associated with the presence of ground contamination the linkages between the sources and potential receptors to contamination need to be established and evaluated. This is in accordance with the Environmental Protection Act 1990, which provides a statutory definition of Contaminated Land. To fall within this definition it is necessary that, as a result of the condition of the land, substances may be present on or under the land such that;

- *Significant harm is being caused or there is a significant possibility of such harm being caused; or*
- *Pollution of controlled waters is being, or is likely to be, caused*

There are three principal factors that are assessed whilst undertaking a qualitative risk assessment for any site. These are the presence of a contamination source, the existence of migration pathways and the presence of a sensitive target(s). It should be noted that it is necessary for each element of source, pathway and target to be present in order for exposure of a human or environmental receptor to occur.

UK Government guidance on the assessment of contaminated land, requires risk to human health and the environment to be reviewed using source ï pathway ï target relationships. If each of these elements is present, the linkage provides a potential risk to the identified targets. ***Contaminants or potential pollutants*** identified as ***sources*** in relation to the identified previous uses are listed below in Table 1.

Table 1: Identified Potential Contaminant Sources

Contaminant Source	***Comments***
Buildings/Drainage	The existing buildings may have asbestos containing material (ACM) within their construction. Effluent from existing drains could provide a contaminant source.
Electricity Sub-station	Leakage or spillage of transformer insulation oil or coolant from the electricity sub-station.
Soil Beneath Site	Contamination may be present within made ground beneath the site. Made ground may be present beneath the site including demolition rubble associated with the former buildings, which may have contained asbestos containing materials (ACMs). .
Soil Gas	Potential soil gas generated from made ground or underlying natural strata.
Ground Contamination Outside Site Boundary	Ground contamination migrating from adjoining industrial sites, such as the former printing works to the north and the smithy to the south-east.

A ***Pathway*** is defined as one or more routes through which a receptor is being, or could be, exposed to, or affected by, a given contaminant.

Potential ***Target or Receptors*** fall within the categories of Human Health, Water Environment, Flora and Fauna, and Building Materials.

There are a number of possible pathways for the contaminants identified on the site to impact human and/or environmental receptors and these are summarised in Tables 2 and 3.

Table 2: Human Receptors and Pathways

Human Receptor-Mechanism	***Typical Exposure Pathway***
Human Inhalation	Breathing Dust and Fumes Breathing Gas emissions
Human Ingestion	Eating -contaminated soil, for example by small children -plants grown on contaminated soil Ingesting dust or soil on fruit or vegetables Drinking contaminated water
Human Contact	Direct skin contact with contamination Direct skin contact with contaminated liquids

Table 3: Water Receptors and Pathways

Receptor-Water Environment	***Typical Exposure Pathway***
Groundwater The site is recorded as being covered by the Unproductive stratum of the Langley Silt and the Secondary (A) Aquifer of the Lynch Hill Gravel, and is underlain by the Unproductive stratum of the London Clay.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and migrate to underlying groundwater. Contamination leads to restriction/prevention of use as a resource, for example, drinking water, and can have secondary impacts on other resources, which depend on it.
Surface Water/River Networks No surface water features or river networks are recorded within 250m of the site.	Surface infiltration of atmospheric waters into the soils beneath the site could wash or dissolve potential contaminants and laterally migrate. Contamination leads to a restriction/prevention of use: -as drinking water resource -for amenity use Effects on aquatic life

Table 4: Preliminary Conceptual Model Relative to Construction/Future Use of Site

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources				
		Buildings/ Drainage	**Electricity Sub-station**	**Soil Beneath Site**	**Soil Gas**	**Ground Contamination Outside Site Boundary**
Human Health ï construction workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Likely	Low likelihood	Low likelihood	Low likelihood	Low likelihood
Human Health ï users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Low likelihood	Low likelihood	Low likelihood	Low likelihood	Low likelihood
Water Environment	Migration through ground into surface water or groundwater	Unlikely	Low likelihood	Low likelihood	Unlikely	Unlikely
Flora	Vegetation on site growing on contaminated soil	Unlikely	Low likelihood	Low likelihood	Unlikely	Unlikely
Building Materials	Contact with contaminated soil	Unlikely	Low likelihood	Low likelihood	Unlikely	Unlikely

Key to Table 4

Estimated Potential for Linkage with Contaminant Source	**Definition**
High likelihood	There is a pollution linkage and an event that either appears very likely in the short term and almost inevitable over the long term, or there is evidence at the receptor of harm or pollution.
Likely	There is a pollution linkage and all the elements are present and in the right place, which means that it is probable that an event will occur. Circumstances are such that an event is not inevitable, but possible in the short term and likely over the long term.
Low likelihood	There is a pollution linkage and circumstances are possible under which an event could occur. However, it is by no means certain that even over a longer period such an event would take place, and is less likely in the shorter term.
Unlikely	There is a pollution linkage but circumstances are such that it is improbable that an event would occur even in the very long term.
N/A	Not Applicable

SITE WORK

A single cable percussive borehole (BH 1), three window sample boreholes (WS 1 to WS 3) and eight foundation inspection pits (TP 1, TP 2A, TP 2B and TP 3 to TP 7) were undertaken on 22nd and 23rd October 2018 at locations depicted on the site plan at the rear of this report.

The investigation was undertaken following the protocols detailed in British Standards (BS) ôCode of Practice for Site Investigationsô (BS5930:2015), ôMethods of test for soils for engineering purposesô (BS1377:1990), and ôInvestigation of Potentially Contaminated Sitesô (BS10175:2001). The investigation was supervised by a Geotechnical Engineer.

Services information was obtained prior to the start of the investigation and was referenced in relation to the exploratory hole positions prior to boring and a scan was undertaken using a cable avoidance tool (CAT).

The ground levels at the exploratory hole positions have been related to Ordnance Datum (OD) by interpolation using the spot heights marked on a topographic plan provided by the Engineer.

The exploratory hole records give the descriptions and depths of the various strata encountered, results of the in-situ tests, details of all samples taken and the groundwater conditions observed during excavation/boring, on completion and subsequently in the standpipes. Sketches and photographs of the exposed foundations are presented alongside the exploratory hole records.

Cable Percussive Borehole

A single cable percussive borehole was undertaken by a restricted access cable percussive boring rig on 22nd October 2018. Prior to boring, the surface layer of hardstanding was broken out using a small hand held breaker, and a starter pit was dug to 1.20m below ground level using hand tools, in order to ensure the absence of buried services.

The borehole was then advanced using weighted shell and claycutter tools, initially working within 150mm diameter casing, and was completed at the intended depth of 15.00m below ground level.

A standard penetration test (SPT) was undertaken at the base of the starter pit in order to give an indication of the in-situ relative density/shear strength of the soils encountered at shallow depth. The test was made by driving a 50mm diameter solid cone point (C) into the soil at the base of the borehole by means of an automatic trip hammer weighing 63.50kg falling freely through 760mm. The penetration resistance was determined as the number of blows (N) required to drive the tool the final 300mm of a total penetration of 450mm into the soil ahead of the borehole.

Undisturbed samples (U) nominally 100mm in diameter were taken in clay, where possible. The ends of the samples were capped and sealed to maintain them in as representative condition as possible during transit to the laboratory.

Representative small (D) and bulk (B) disturbed samples of soil were taken from the boring tools at regular intervals throughout the depth of the boreholes.

On completion of the borehole, a 50mm diameter gas and groundwater monitoring standpipes was installed to 7.00m depth. The annulus around the standpipe was backfilled with pea gravel with a bentonite seal placed around the top of the installation within 1.00m of ground level. A gas tap was installed in the top of the standpipe and a protective stopcock cover was concreted into the ground flush with the surface. The borehole beneath the installation was backfilled with arisings.

Window Sample Boreholes

Three window sample boreholes were undertaken on 23rd October 2018 by a small, tracked, super heavy dynamic sampling rig. Prior to boring, after the hardstanding had been broken out as described previously, a starter pit was dug to 1.20m below ground level using hand tools, in order to ensure the absence of buried services.

The window sampling equipment consisted of 1.00m long drive-in samplers of specially constructed and strengthened 87mm to 57mm diameter steel sample tubes with a plastic core-liner. The samplers were driven into the ground from the base of the hole by an automatic trip hammer weighing 63.50kg falling freely through 750mm. Upon extraction a continuous profile of the soil was obtained in the plastic liners (U) inserted in the samplers. These boreholes were completed at their intended depth of 5.45m below ground level.

Standard penetration tests were undertaken in the window sample boreholes at regular intervals in order to give an indication of the in-situ relative density/shear strength of the material. The test was made by driving a 50mm diameter open shoe and split spoon sampler (S) into the soil at the base of the borehole by means of an automatic trip hammer weighing 63.50kg falling freely through 750mm. The penetration resistance was determined as the number of blows required to drive the tool the final 300mm of a total penetration of 450mm into the soil ahead of the borehole. The results have been added to the exploratory hole records.

Small disturbed samples (D) of soil were recovered at regular intervals within the starter pits and the boreholes.

On completion the window sample boreholes were backfilled with arisings and the surface layers were reinstated.

Foundation Inspection Pits

Eight foundation inspection pits (TP 1, TP 2A, TP 2B, and TP 3 to TP 7) were excavated using hand tools on 22nd and 23rd October 2018. A small hydraulic breaker was used to break out the surface hardstanding. Trial pits TP 1, TP 2B, TP 3, TP 4, TP 5 and TP 7 were extended using hand auger tools from depths between 1.20m and 1.80m to completion at between 1.50m and 3.20m below ground level. The exposed strata and foundations were logged and the soils sampled by the supervising Geotechnical Engineer.

Small (D) disturbed samples of soil were taken at regular intervals throughout these pits and placed in polycarbonate pots. Additional environmental (ES) samples were taken within made ground and placed into glass jars.

In clay soils, an immediate assessment of the apparent soil cohesion was made using a Pilcon hand shear vane (V). The results, in kPa, have been added to the borehole records.

On completion of each excavation, the spoil was returned to the pit and replaced in compacted layers and the surface hardstanding reinstated.

Gas and Groundwater Monitoring

Three return visits were made during November 2018 in order to monitor methane, carbon dioxide and oxygen gas levels in the borehole standpipe. On each occasion the ambient pressure and flow rate was also recorded together with the depth to groundwater. The water levels have been added to the borehole BH 1 record and the gas/groundwater results are tabulated following the exploratory hole records.

LABORATORY TESTING

The samples were inspected in the laboratory and assessments of the soil characteristics have been taken into account during preparation of the exploratory hole records. The soil sample descriptions are in accordance with BS5930:2015.

Chemical analysis of selected soil samples recovered from the exploratory holes was undertaken, by an independent laboratory, primarily for characterisation purposes. The chemical testing programme was devised by Ground Engineering Limited for a broad suite of potential contaminants, outlined by the Environment Agency (EA) and National House Building Council (NHBC) document R&D 66; 2008 ‘Guidance for the Safe Development of Housing on Land Affected by Contamination’.

The geotechnical tests were conducted to BS1377:1990 & 2016 and other industry standards, and the results are presented at the rear of this report, whilst the results of the chemical tests are presented in Appendix 3.

Geotechnical Testing

The moisture content and index properties of selected soil samples were determined as a guide to soil classification and behaviour. The liquid limit was determined by the cone penetrometer method.

Test specimens were prepared at full diameter from selected undisturbed samples recovered from the deep borehole. Immediate undrained triaxial compression tests were made on the samples at full diameter using a single pressure broadly equivalent to the overburden pressure at each sample's depth. The moisture content and bulk densities of each specimen were also determined. The triaxial test results have been plotted against depth and are presented on Figure 1.

An indication of the settlement characteristics of a selected sample was obtained from a test in the consolidation apparatus or oedometer. The test was performed on a 75mm

diameter sample, about 19mm thick, contained in a steel ring. The sample was saturated and the swelling pressure balanced prior to applying a constant load with drainage at both ends. When primary compression was complete, the load was increased and this repeated for three increments of load. The sample was then unloaded in a single stage. The rate and total amount of consolidation were continually monitored using a computer controlled E.L.E. Datasystem 7 Unit. The results were plotted and analysed by the computer for each increment of load to obtain the coefficients of compressibility (m_v), and of consolidation (c_v), which govern the amount and rate of settlement, respectively.

Selected samples of soil were analysed to determine the concentration of soluble sulphates. The pH values were also determined using an electrometric method.

Chemical Testing

Selected soil samples recovered from the exploratory holes were tested for total concentrations of arsenic, cadmium, chromium, lead, mercury, selenium, nickel and benzo[a]pyrene, together with speciated polyaromatic hydrocarbons (PAH), boron, copper and zinc, phenols, total and free cyanide, hexavalent chromium, sulphate, sulphide, and pH. The organic content of these samples was also determined. A single sample was also screened for asbestos containing material (ACM).

A sample of made ground (BH 1, 0.30m to 0.80m) was tested for a Waste Acceptance Criteria (WAC) CEN Leachate Suite at 10l/kg.

GROUND CONDITIONS

The ground conditions encountered by the exploratory holes comprised a cover of made ground, locally over a Head Deposit, which was underlain by the expected solid geology of the London Clay Formation. The latter was met at 1.40m to 2.20m depth and found to at least 15.00m below ground level. The expected superficial Langley Silt and Lynch Hill Gravel was not met within any of the exploratory holes, however, in the southern part of the site, where the superficial deposits were expected, the base of the made ground was not found, and the underlying natural soils not exposed.

The exploratory holes were generally recorded as dry during excavation/boring and upon completion, although water was met 'perched' at the base of the made ground in TP 6. The standpipes were recorded as dry during the return monitoring visits.

A south-west to north-east soil profile of the ground conditions encountered is presented as Figure 2.

Made Ground

The site was covered by a 0.05m to 0.15m thick surface layer of asphalt. This asphalt was underlain from 0.05m depth in TP 2A by concrete, which was found to 0.20m below ground level before the pit was abandoned due to the presence of a suspected service.

The asphalt was underlain by a brown, dark brown and dark grey, locally clayey, silty sand and gravel fill with occasional cobbles of brick and with a gravel fraction of flint, limestone, brick, concrete, mortar, slate, pottery, asphalt, clinker and slag fragments. Fragments of asbestos containing material were identified within this layer in BH 1. This coarse grained fill was at least 1.60m thick in TP 1, where it was found to at least the base of the pit at 1.70m below ground level, where it was abandoned due to difficulty in advancing the hole. Elsewhere this coarse grained fill was between 0.25m and 1.40m thick and found to between 0.35m and 1.50m below ground level.

The coarse grained fill was underlain by a soft, locally firm or stiff, brown, orange brown, dark brown, grey and dark grey mottled, slightly sandy, slightly gravelly silty clay fill that locally contained cobbles of brick. This clay fill was between 0.45m and at least 1.95m thick and had a gravel fraction of flint, quartzite, limestone, brick, concrete, mortar, slate, glass, pottery, vitrified pipe, asphalt, coal, clinker and ash fragments. The clay fill was found to at least the base of trial pits TP 2B, TP 3, and TP 4 at between 1.50m and 3.20m below ground level. Trial pits TP 2B and TP 3 were abandoned at the top of the suspected footing. The base of the clay fill was found at between 1.40m and 2.20m below ground level in the remaining exploratory holes.

The base of the made ground was proved at depths between 1.40m and 2.20m below ground level, except in the south-western and western parts of the site (TP 1, TP 2A, TP 2B, TP 3 and TP 4), where it was found to depths between at least 1.50m and at least 3.20m below ground level. The deeper made ground found in TP 1 to TP 3 is likely associated with the presence of a basement beneath the main school building in this part of the site.

Head Deposit

At between 1.40m and 1.60m depth in WS 1, WS 3 and TP 5, a firm or stiff, brown and orange brown mottled, slightly gravelly, silty clay with a gravel fraction of sub-angular to rounded flint and limestone was met. This Head Deposit clay was at least 0.20m thick in TP 5, where it was found to the base of the hole at 1.80m depth, and was found to be 0.40m and 0.70m thick in WS 1 and WS 3, respectively, to depths of 1.80m and 2.20m below ground level.

London Clay

The solid geology of the London Clay was met at depths between 1.40m and 2.20m below ground level, either beneath the Head Deposit across the centre of the site, or below the made ground in the north-eastern and eastern parts of the site.

Initially the London Clay was highly weathered to a generally stiff, locally firm, brown, orange brown and grey mottled, silty clay with occasional gravel size calcareous

concretions and rare part decayed root traces. This 'structureless' clay was between at least 0.20m and 0.50m thick; and was found to at least 1.70m and 1.60m depth in TP 6 and TP 7, where these holes were both completed. In the remaining holes (WS 1 to WS 3 and BH 1), this 'structureless' clay was found to between 2.00m and 2.60m below ground level, below which the London Clay was weathered to a firm, becoming stiff, closely fissured, brown clay. The fissure planes within the weathered London Clay were stained grey, and this stratum contained rare selenite crystals, pyrite nodules and silt partings. A thickly laminated, very weak or weak, orange brown and red brown, argillaceous, concretionary limestone nodule was met at between 4.40m and 4.70m depth in WS 2, WS 3 and BH 1. This weathered London Clay was found to at least the base of WS 1 and WS 2 at 5.45m depth and was found to 4.80m and 5.40m depth in WS 3 and BH 1, respectively.

The London Clay from 4.80m in WS 1 and 5.40m in BH 1 was a stiff, closely fissured, grey brown clay with rare pyrite nodules. Borehole WS 1 was completed within the London Clay at 5.45m below ground level.

From 12.50m depth in BH 1, the London Clay became a stiff, grey brown, slightly sandy, silty clay with occasional silt partings and rare pyrite nodules. This sandy London Clay was found to 14.50m depth, when the London Clay became a very stiff, closely fissured, grey brown clay to at least the base of the borehole at 15.00m below ground level.

Groundwater

All of the exploratory holes were recorded as dry during boring/excavation and upon completion. The exception was TP 6, where groundwater was met at 1.40m below ground level ópercheddwithin the made ground above the London Clay.

The 7.00m deep standpipe installed within BH 1 was recorded as dry during the three return monitoring visits in November 2018.

Evidence of Contamination

Based on inspection the made ground contained fragments of brick, concrete, mortar, glass, pottery, asphalt, clinker, coal, ash and slag.

No visual or olfactory evidence of hydrocarbon contamination was detected in the exploratory holes.

Fragments of asbestos containing material, identified as containing chrysotile, were recorded within BH 1 at 0.10m to 1.00m below ground level.

Live Roots

No live roots were observed within any of the exploratory holes.

Existing Foundations

In TP 1, the brickwork of the three-storey building rested, at 0.30m depth, upon weak concrete that projected 0.50m from the wall and extended to at least 1.70m below ground level.

In TP 2, the brickwork wall was supported by brick corbels that rested at 2.30m depth upon a suspected concrete footing, the edge and base of which were not found.

In TP 3, the brickwork wall rested at 3.20m depth upon a suspected concrete footing, the edge and base of which were not found.

The brickwork wall of the gymnasium, in TP 4, rested at 0.55m depth upon a 0.45m thick concrete footing that projected 0.30m or 0.45m and was based within clay fill.

The brickwork wall of the main school building, exposed in TP 5 to TP 7, was supported by brick corbels that rested at between 0.83m and 0.88m depth upon a 0.55m to 0.77m thick concrete footing, which projected up to 0.40m and was based in Head Deposit clay or highly weathered London Clay.

COMMENTS ON THE GROUND CONDITIONS IN RELATION TO FOUNDATION DESIGN AND CONSTRUCTION

The site is covered by a made ground, locally mantling a superficial Head Deposit and underlain by the expected solid geology London Clay. The made ground was deepest adjacent to an existing basement, where it was locally found to at least 3.20m below ground level. The firm becoming stiff, then very stiff London Clay was met at between 1.40m to 2.20m below ground level.

It is proposed that the main building is converted into offices, with a lift to be added to the southern facing. A two-storey brick building will also be constructed within the northern part of the site.

Traditional foundations may be sufficient to support the loads of the proposed redevelopment. These footings would need to be extended through the made ground and Head Deposit, and into the top of the underlying London Clay. Piled foundations would be needed to support heavy building loads. A lightly loaded floor slab could be ground bearing, but a heavily loaded floor, or one sensitive to differential movement, would need to be suspended on the foundations.

Foundation Depths

The exploratory holes encountered made ground to depths between 1.40m and at least 3.20m. Large scale processes of natural sedimentation allow a certain degree of confidence to be placed in the absence of important variation of the engineering properties of natural soils across sites. By contrast, made ground, whose history is not completely known, must, despite any amount of investigation, inevitably present the possibility of conditions existing which could not be accepted when considering the material as a bearing stratum.

There are occasions when constructing foundations on made ground can be contemplated, such as in the south-western part of the site, where a significant thickness of made

ground was encountered and it is understood a new entrance structure is now proposed. Unfortunately the bearing properties of the made ground in this part of the site cannot be accurately estimated due to the lack of in-situ data within the fill adjacent the deep foundations/school basement. Any new structure would have to be very lightly loaded, and would need to be structurally independent of the existing building. Additional intrusive works would be required at the location of the new entrance structure, in order to assess the bearing properties of the made ground and underlying soil.

The Head Deposit (ðhillwashð), formed by the downslope movement of soils, is considered to be in a metastable state and as such should be considered unsuitable founding strata on this site. The foundations of new structures should therefore also be extended through the Head Deposit.

The underlying naturally deposited London Clay had modified plasticity indices of 38%, 46% and 48%, which would therefore be classed as having a medium to high volume change potential. In open, naturally deposited ground, at least 30m from the trees, the National House Building Council (NHBC) Standards Chapter 4.2 ñBuilding near treesò (2018) recommends a minimum foundation depth of 1.00m in soils with a high volume change potential.

The areas of soft landscaping contained Cherry, Elder, Lime, London Plane, Hawthorn, Rowan, Field Maple, Apple and Plum trees.

Although trees were present in areas of soft landscaping around the site, none were within influencing distance of any proposed structures and no live roots were observed during this investigation. Foundations should be taken at least 0.50m below the last vestiges of live roots in clay soils.

Foundations within the range of influence of trees, whether they are removed or retained, will have to be separated from the soil by a suitable void former. The required gap dimensions for footings in the high volume change potential clay soils are detailed in the previously cited NHBC document.

In summary, foundations for new buildings will need to penetrate the made ground and Head Deposit and so will be a minimum of 1.40m deep, and may need to be taken to greater than 3.00m below ground level.

Bearing Capacity/Settlement

The London Clay, met below at least 1.50m depth was initially of a firm consistency, and the design of footings placed upon it at or below the minimum depth of 1.50m could use a maximum safe bearing capacity of 135kN/m^2, for a 1.00m wide strip footing, with a factor of safety of 3.0 against general shear failure, whilst a 1.00m wide square pad at the same depth could be designed using a maximum safe bearing capacity of 160kN/m^2, with the same factor of safety.

The results of the oedometer tests indicate that consolidation settlement of 2m deep foundations within the London Clay would be in the order of 20mm to 25mm for the foundations and bearing pressures detailed above, and so within tolerable limits for load bearing brickwork.

Excavations/Groundwater

The exploratory holes were recorded as dry on excavation/boring and completion, except for TP 6, where water was met óperchedô at 1.40m depth, within the made ground above the London Clay. The monitoring installation was recorded as dry during the return visits in November 2018.

In the event that foundation excavations encounter 'perched' water they will need to be dewatered by screened sump pump techniques. The London Clay may be regarded as highly susceptible to 'loss of strength' if inundated, and so the control of groundwater and surface water run-off is important if the initially modest bearing properties of these strata are not to be compromised.

The base of foundation excavations should be inspected on completion to ensure that the condition of the soil complies with that assumed in design. Should pockets of inferior material be present, they should be removed and replaced with well graded hardcore or lean mix concrete. The excavated surface should be protected from deterioration and a blinding layer of concrete used where foundations are not completed without delay.

Safety precautions should not be neglected especially where personnel are to enter excavations, when close side support will be required in order to maintain excavation stability. All excavations should be undertaken in accordance with CIRIA Report 97 ó*Trenching Practice*ô. This is especially important on this site as foundation excavations are unlikely to stand unsupported even in the short term where 'perched' water is present.

Piled Foundations

Piled foundations may be considered as an alternative to deepened strip and trench fill foundations. The ground conditions are considered suitable for bored or CFA, but not driven piles as the vibrations during installation of driven piles could damage the existing adjacent structures/dwellings. The advice of specialist piling contractors should be sought as to their preferred method of pile installation in these conditions on this site and their attention drawn to the presence of cobble size concretions within the London Clay.

Preliminary working loads for a single bored pile, outside the zone of influence of any trees, may be estimated for design and cost purposes using pile bearing coefficients, which are based on the following assumptions.

1) The ultimate load on a pile would be the sum of the side friction/adhesion acting on the pile shaft together with the end bearing load.

2) The pile bearing properties within the made ground and Head Deposit have been ignored.

3) London Clay, the shaft adhesion and end bearing would be a function of apparent cohesion values determined by the laboratory triaxial compression strength tests (Figure 1).

4) A factor of safety of at least 2.0 would be used to assess pile working loads. If test loading of selected piles were not practical the factor of safety would be increased to at least 2.5.

5) Where piles are installed in groups it will be necessary to position them at least 2.5 diameters apart, otherwise a reduction in individual working load will need to be taken into account.

Item	**Ultimate Pile Bearing Value kN/m^2**
Shaft adhesion/friction in made ground	Ignored
Average shaft adhesion in London Clay, 1.5m to 4m	30
Average shaft adhesion in London Clay, 4m to 10m	50
Average shaft adhesion in London Clay below 10m	75
End bearing in London Clay, 4m to 10m	900
End bearing in London Clay at and below 10m	1350

Using these coefficients it is estimated that single, 300mm and 450mm diameter bored piles end bearing in the London Clay at 7m depth would have respective anticipated working loads of 110kN and 185kN, with a factor of safety of 2.5. Whilst 12m deep bored piles, at these two diameters, would have respective working loads of 235kN (300mm) and 380kN (450mm), respectively, with the same factor of safety.

Different pile lengths, or diameters, from those detailed above would give different available working loads, as would pile groups, which could be tailored to suit the working loads required. A piling specialist should undertake final design of piles.

Floor Slab

A lightly loaded floor slab could be ground bearing following removal of the surface layer of made ground, its replacement with well graded and compacted stone, careful inspection and preparation using a vibratory roller. The adoption of a ground bearing floor slab greatly depends on the careful and correctly supervised placement of such fill, otherwise it will need to be suspended on the deepened trench fill or piled foundations in order to avoid differential movement between them.

A careful check should be made for soft/loose ground or root infested clay. If present, such poor ground should also be removed and replaced with coarse-grained fill. For areas of deeper made ground or root affected clay, further excavation may be warranted or a suspended floor slab may be more practical.

Buried Concrete

Sulphate analysis of the soil samples tested gave results in Design Sulphate Classes DS-1 to DS-4 of the BRE Special Digest 1, Table C2 (2005) presented in Appendix 4. The highest DS-4 result was obtained from the made ground at shallow depth, and the DS-3 results were from the London Clay at depth. The characteristic sulphate value, to the nearest 100mg/l, would be 3000mg/l, and so DS-3. The pH results were between 7.5 and 10.3 and so alkaline.

London Clay is listed in this publication as being strata that may contain sulphides, such as pyrite, hence oxidation due to disturbance during the excavation of foundations may increase the total potential sulphate content. Visual evidence of pyrite beneath this site was occasionally recorded at depth within the London Clay. It should be noted that the use of piled foundations would minimise disturbance of the ground and consequently reduce the potential for the oxidation of any pyritic clay.

Using the characteristic soil sulphate (3000mg/l) and pH results an Aggressive Chemical Environment for Concrete (ACEC) Class of AC-3 would be considered appropriate for buried concrete beneath this site as detailed in the above cited BRE document.

COMMENTS ON THE CHEMICAL TESTING

The results of the laboratory chemical testing on near surface soil samples have primarily been compared to soil screening values (SSVs) produced by Land Quality Management Limited (LQM) and the Chartered Institute for Environmental Health (CIEH) presented in their document ôThe LQM/CIEH S4ULs for Human Health Risk Assessment: 2015 (Publication Number S4UL3608)ô. The LQM/CIEH S4ULs are intended for use in assessing the potential risks posed to human health by contaminants in soil and are transparently-derived and cautious ótrigger valuesô above which further assessment of the risks or remedial action may be needed. The S4ULs (Suitable for Use Levels) have been derived, in accordance with UK legislation and Environment Agency policy, using a modified version of the Environment Agency CLEA 1.06 software.

Reference has also been given to ATRISKsoil soil screening values produced by Atkins Limited and provided under licence to Ground Engineering Limited. Atkins SSVs have been derived in line with the Environment Agency 2009 guidance using the CLEA 1.04 and 1.06 software. With the absence of a S4UL for cyanide the ATRISKsoil SSV has been used as the soil screening criteria within this report.

In 2014 the Department for Environment Food and Rural Affairs (DEFRA) published, in their document SP1010, Category 4 Screening Levels (C4SL) for several contaminants including lead. The C4SL represent screening levels below which the land could be considered suitable for a specified use and definitely not contaminated land in respect of those determinands. With the absence of S4UL for lead the C4SL has been used as the soil screening criteria within this report.

For each contaminant the adopted soil screening criteria have been calculated for the following land uses:

- Residential use with home grown produce
- Residential use without home grown produce
- Commercial and industrial usage

The intended purpose of the SSVs are as ñintervention valuesò in the regulatory framework for assessment of human health risks in relation to land use. These values are not binding standards, but are intended to inform judgements about the need for action to ensure that a new use of land does not pose any unacceptable risks to the health of the intended users.

Table 5 compares the test results for the made ground with the SSVs in relation to the specified uses. The number of test results, which exceed these values, are also provided.

Table 5: Comparison of Chemical Test Results for Made Ground with SSV

Determinand	Number of Samples	Min Value (mg/kg)	Max Value (mg/kg)	Number of Samples Exceeding SSV for:			Measured 95th Percentile (mg/kg)	Soil Screening Criteria SSV (1% SOM)			
				Residential with home grown produce	Residential without home grown produce	Commercial/ Industrial		Assessment Method	Residential with home grown produce mg/kg	Residential without home grown produce mg/kg	Commercial/ Industrial mg/kg
Organic matter	6	0.74%	5.7%	-	-	-	-	-	-	-	-
Arsenic	6	15	28	0	0	0	25.28	S4UL	37	40	640
Cadmium	6	<0.10	0.31	0	0	0	0.30	S4UL	11	85	190
Trivalent* Chromium	6	15	35	0	0	0	31.65	S4UL	910	910	8600
Hexavalent Chromium	6	<0.50	<0.50	0	0	0	<0.50	S4UL	6	6	33
Lead	6	44	770	4	1	0	466.95	C4SL	200	310	2330
Mercury	6	0.20	1.9	0	0	0	1.53	S4UL	11	15	320
Selenium	6	<0.20	<0.20	0	0	0	<0.20	S4UL	250	430	12,000
Nickel	6	18	60	0	0	0	49.00	S4UL	130	180	980
Phenols	6	<0.30	0.36	0	0	0	0.33	S4UL	120	440	440
Benzo[a]pyrene	6	<0.10	30	5	4	2	21.18	S4UL	0.79	1.2	15
Copper	6	36	76	0	0	0	61.07	S4UL	2400	7100	68,000
Zinc	6	58	290	0	0	0	192.34	S4UL	3700	40,000	730,000
Free Cyanide	6	<0.50	<0.50	0	0	0	<0.50	ATRISK	34	34	34

Notes

*The concentration of Trivalent Chromium is assumed to be equivalent to the Total Chromium concentration. This is because most naturally occurring chromium is in the trivalent (chromic) state.

S4UL and C4SL for metals were derived using 6% SOM. These values are not sensitive to SOM and would also be applicable for 1% SOM and 2.5% SOM.

Discussion of Results and Statistics

The results of the laboratory analysis (Table 5) indicate the made ground beneath the site contains elevated concentrations of lead and benzo[a]pyrene, which exceeded the residential with home grown produce and residential without home grown produce soil screening values. Concentrations of benzo[a]pyrene also exceeded the soil screening value for a commercial/industrial end use. None of the other contaminants tested for exceeded their respective screening values for a residential or commercial/industrial land use.

Statistical analysis, based on the mean value test, indicates that the US95 values for lead and benzo[a]pyrene also exceed their respective SSVs for a residential with home grown produce end use and residential without home grown produce end use. The US95 value for benzo[a]pyrene also exceeded the SSV for a commercial/industrial end use. The maximum value test for the lead and benzo[a]pyrene data indicates that the highest lead (770mg/kg) and benzo[a]pyrene (30mg/kg) values obtained are not statistical outliers, and so are representative of the respective sample populations.

The elevated results appear to reflect the presence of ash and coal within the made ground beneath the site.

The results indicate that the made ground beneath the site would not be considered suitable for retention at the surface in residential with home grown produce and residential without home grown produce settings due to the presence of statistically elevated concentrations of lead and benzo[a]pyrene. The results also indicate that the made ground would not be suitable for retention at the surface in the proposed commercial/industrial redevelopment due to statistically elevated levels of benzo[a]pyrene.

Visual and olfactory evidence of hydrocarbon impacted soils was not detected within the soils beneath this site during the investigation. The TPH results obtained from the WAC test was 380mg/kg. In the absence of any olfactory or visual evidence of hydrocarbons the results are considered to reflect the presence of coal rather than fuel spillages.

A sample of cement bound asbestos, containing chrysotile, was positively identified in BH 1 between 0.10m and 0.30m. No ACM was detected within the remaining samples selected for screening.

SOIL GAS MONITORING RESULTS

Three return visits to site in November 2018 recorded concentrations of landfill type gasses (methane, carbon dioxide and oxygen) in the borehole standpipe. The results are presented to the rear of the exploratory hole records. The recorded concentrations of methane were all <0.1%. The carbon dioxide levels were steady, between 1.3% and 1.4%. The recorded oxygen concentrations within the standpipe was slightly depleted when compared to atmospheric conditions. The in-situ measurement confirmed a negligible gas emission rate with a recorded flow rate of <0.1l/hr in all instances.

Assuming a 'worst case' positive flow rate of 0.1l/hr, the results give a Gas Screening Value (GSV) of 0.0014l/hr. This GSV falls within Characteristic Situation 1 as defined by BS8485:2015 óCode of practice for the design of protective measures for methane and carbon dioxide ground gases for new buildingsô.

UPDATED CONCEPTUAL MODEL

An assessment of the potential linkage between ground contamination sources, human and environmental receptors has been based on the desk study and intrusive ground investigation documented in the preceding sections of this report.

A generalised conceptual model, updated following the intrusive works, monitoring and testing, and targeted to provide coverage across the site, relative to the construction phase and completed development, is presented below in Table 6.

Table 6: Updated Conceptual Model Relative to Construction and Future Development

Receptors	Pathway	Estimated Potential for Linkage with Contaminant Sources				
		Buildings/ Drainage	Electricity Sub-station	Soil Beneath Site	Soil Gas	Ground Contamination Outside Site Boundary
Human Health ï ground workers	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	Moderate	Moderate	Moderate	Very Low	Very Low
Human Health ï users of completed development	Ingestion and Inhalation of contaminated Soil, Dust and Vapour	N/A	Very Low	Low	Very Low	Very Low
Water Environment	Migration through ground into surface water or groundwater	N/A	Very Low	Very Low	Very Low	Very Low
Flora	Vegetation on site growing on contaminated soil.	N/A	Very Low	Very Low	Very Low	Very Low
Building Materials	Contact with contaminated soil	N/A	Very Low	Very Low	Very Low	Very Low

Key to Table 6

RISK	Definition
Very High	There is a high probability that severe harm could arise to a designated receptor from an identified hazard, or, there is evidence that severe harm to a designated receptor is currently happening. The risk, if realised, is likely to result in a substantial liability. Urgent investigation (if not undertaken already) and remediation are likely to be required.
High	Harm is likely to arise to a designated receptor from an identified hazard. Realisation of the risk is likely to present a substantial liability. Urgent investigation (if not undertaken already) and remedial works may be necessary in the short term and likely over the long term.
Moderate	It is possible that harm could arise to a designated receptor from an identified hazard. However, it is either relatively unlikely that any such harm would be severe, or if any harm were to occur it is more likely that the harm would be relatively mild.
Low	It is possible that harm could arise to a designated receptor from an identified hazard, but it is likely that this harm, if realised, would at worst normally be mild.
Very Low	There is a low possibility that harm could arise to a receptor. In the event of such harm being realised it is not likely to be severe.
N/A	Not Applicable because the proposed development will remove the source.

COMMENTS ON GROUND CONTAMINATION IN RELATION TO PROPOSED DEVELOPMENT

It is proposed that the Maria Fidelis Lower School site is redeveloped into offices, and a training centre is to be constructed in the northern part of the site. No new areas of soft landscaping are anticipated within the site, although this will need to be confirmed. Anticipated exposure scenarios relating to the site and future redevelopment works including remedial options as applicable are discussed as follows.

This investigation may not have revealed the full extent of contamination on the site and appropriate professional advice should be sought if subsequent site works reveal materials that may appear to be contaminated.

Contaminated Soil

The exploratory holes found between 1.40m and at least 3.20m of made ground beneath the site, with the deepest made ground associated with the existing basement. The made ground contained elevated concentrations of lead, benzo[a]pyrene and asbestos containing material. The benzo[a]pyrene results also statistically exceeded the soil screening criteria for the intended commercial/industrial end use.

There is a moderate risk that the made ground soils would affect groundworkers and future end users of the site where the made ground is exposed, such as in gardens or landscaped areas.

Existing Drainage

Redundant foul or surface water drain runs, should be removed from beneath the site and precautions should ensure that any remaining effluent is directly disposed off-site. The integrity of existing drainage should be checked, and where they are to be retained, any damaged

sections should be replaced prior to development. The latter measures should remove any future risk to human health and to the water environment.

Buildings

The existing buildings within the site may have asbestos containing materials within them. Suitable precautions, in line with current best practice, should be put in place to protect workers from the effects of asbestos material, during the redevelopment phase.

Electricity Sub-Station

The electricity sub-station on the south-western boundary of the site is a potential source of contamination. Provided that this is well maintained and that any waste insulation oil is disposed off-site at a suitably licenced facility, the risk of any contamination affecting human health and the water environment is considered to be low.

Human Health - Construction Workers

The presence of lead, benzo[a]pyrene, TPH and asbestos contamination within the made ground soils indicates that there is a moderate risk that a pathway could develop affecting groundworkers during the construction phase of development

No special precautions would be required during the development of the site by workers who may come into contact with the soil during groundworks, providing that standard precautions are adopted which should generally include the procedures given by the Health and Safety Executive (The Blue Book) HS(G)66.

For the protection of workers during groundworks the following is recommended:

a) Limit repeated or prolonged skin contact with soils by wearing gloves with sleeves rolled down.

b) Washing facilities should be made available to groundworkers, so as to minimise the potential for inadvertent ingestion of soil.

c) Generation of dust should be limited by damping-down.

d) Asbestos containing material was encountered within near surface made ground in the northern part of the site. This made ground should not be crushed and it is recommended that the groundworks contractor visually screen such made ground for suspected asbestos and handpick such materials for separate off-site disposal as special waste. Care should be taken to protect ground workers from inhalation of dust.

e) If any soils are revealed which are different to those encountered by this ground investigation, the advice of a specialist should be sought in view of classifying the material and ascertaining its risk to groundworkers.

Human Health - Users of Completed Development

The risk of the identified ground contamination (lead, benzo[a]pyrene and asbestos) affecting the site users in a commercial setting, would be considered to be moderate, where a pathway is present.

Where present beneath buildings and permanent areas of hardstanding, the risk of the encountered ground contamination affecting the site users would be considered to be very low. This is because it would be highly unlikely that the general site users would normally be able to penetrate the building floors, which would be necessary for them to uncover any contaminated soils beneath the site.

The results of the chemical analysis would indicate that the made ground should be considered unsuitable for re-use at the surface within any new garden or landscaped areas. Within such areas scheduled for soft landscaping the made ground should be removed and replaced with a surface covering of at least 0.60m of certified ócleanô topsoil, which would be considered to provide a suitable pathway break. This should be increased to at least 1.00m in any private rear garden areas.

The gas monitoring has determined that a Characteristic Situation 1 classification would apply and that no precautions are required to protect the proposed buildings from ingress of soil gases. No precautionary measures are required to protect the development from radon.

Effects on Services

Consideration should be given to upgrading service materials, particularly for water supply pipes, where they will be in contact with made ground containing elevated concentrations of lead and benzo[a]pyrene, or ensure that the made ground is not used as a backfill around such water supply pipes. Further guidance on the selection of materials for use as water supply pipes should be sought from the local water supplier.

Soil Gas

According to the environmental database information obtained there are no active landfills within influencing distance of the site. The investigation did not encounter significant quantities of organic material within the made ground.

The gas monitoring has determined that a Wilson and Card Characteristic Situation 1 would apply and that no special precautions are required to protect the proposed development from ingress of soil gases.

The site lies within an area where radon protection measures are not required for new dwellings in accordance with BR211.

Water Environment

All of the exploratory holes were recorded as dry during excavation/boring, on completion and during the subsequent monitoring visits. The exception was TP 6 where groundwater was encountered óperchedô above the London Clay at 1.40m below ground level. The site and immediate surrounding area are devoid of watercourses/surface water features and does not lie within 250m of a source protection zone.

It is considered there is a low risk that the proposed commercial/industrial redevelopment, including the construction of piled foundations, would impact the quality of the water environment.

Off-Site Disposal of Soil Arisings

The results of chemical analysis are provided in Appendix 3 and can be used for the basic characterisation of the soil destined for landfill. The Environment Agency publication Hazardous Waste, Technical Guidance WM2 outlines the methodology for classifying wastes and should be referenced for guidance. The test results (total metals, hydrocarbons and cyanide) should be compared to the relevant thresholds to determine whether they fall into the primary categories of non-hazardous waste or hazardous waste and will help indicate the likely European Waste Catalogue (EWC) code, which is determined by the waste type. The results of Waste Acceptance Criteria (WAC) leachate testing should be used to check whether if categorised as non-hazardous waste it could be disposed of at an inert waste landfill; or if categorised as hazardous waste whether it could qualify as stable non-reactive hazardous waste for disposal in non-hazardous landfill.

Excavated material and excess spoil should always be classified prior to removal from site as required by ôDuty of Careô (Environmental Protection Act, 1990) legislation. This means that material has to be given a proper description and waste classification prior to removal. Basic characterisation is the responsibility of the waste producer and compliance checking and on-site verification are generally the responsibility of the landfill operator. The landfill operator will need to liaise with the waste producer as the approach relies on the information from basic characterisation.

It is expected that clean arisings from excavations into the natural soils across this site would also fall into the inert category under the European Waste Catalogue description ôSoil and Stonesô, EWC code 17 05 04 with restrictions excluding topsoil and peat.

CONTAMINATION ASSESSMENT CONCLUSIONS

The proposed redevelopment will convert the existing school building into offices and a new training centre will be constructed. The existing site is detailed on the exploratory hole location plan at the rear of this report. The proposed site layout will need to be confirmed by the Engineer/Architect in order to clearly identify areas of new soft landscaping, if envisaged.

In order to create landscaping on this site, it will be necessary to remove a sufficient thickness of the surface layers of hardstanding and replace them with imported sub-soil/topsoil material. However, as no new areas of soft landscaping are proposed, the remediation of the soils beneath the site is not considered necessary.

If any soils are revealed which are different to those encountered by this ground investigation, the advice of a specialist should be sought in view of classifying the material and ascertaining its risk to groundworkers.

GROUND ENGINEERING LIMITED

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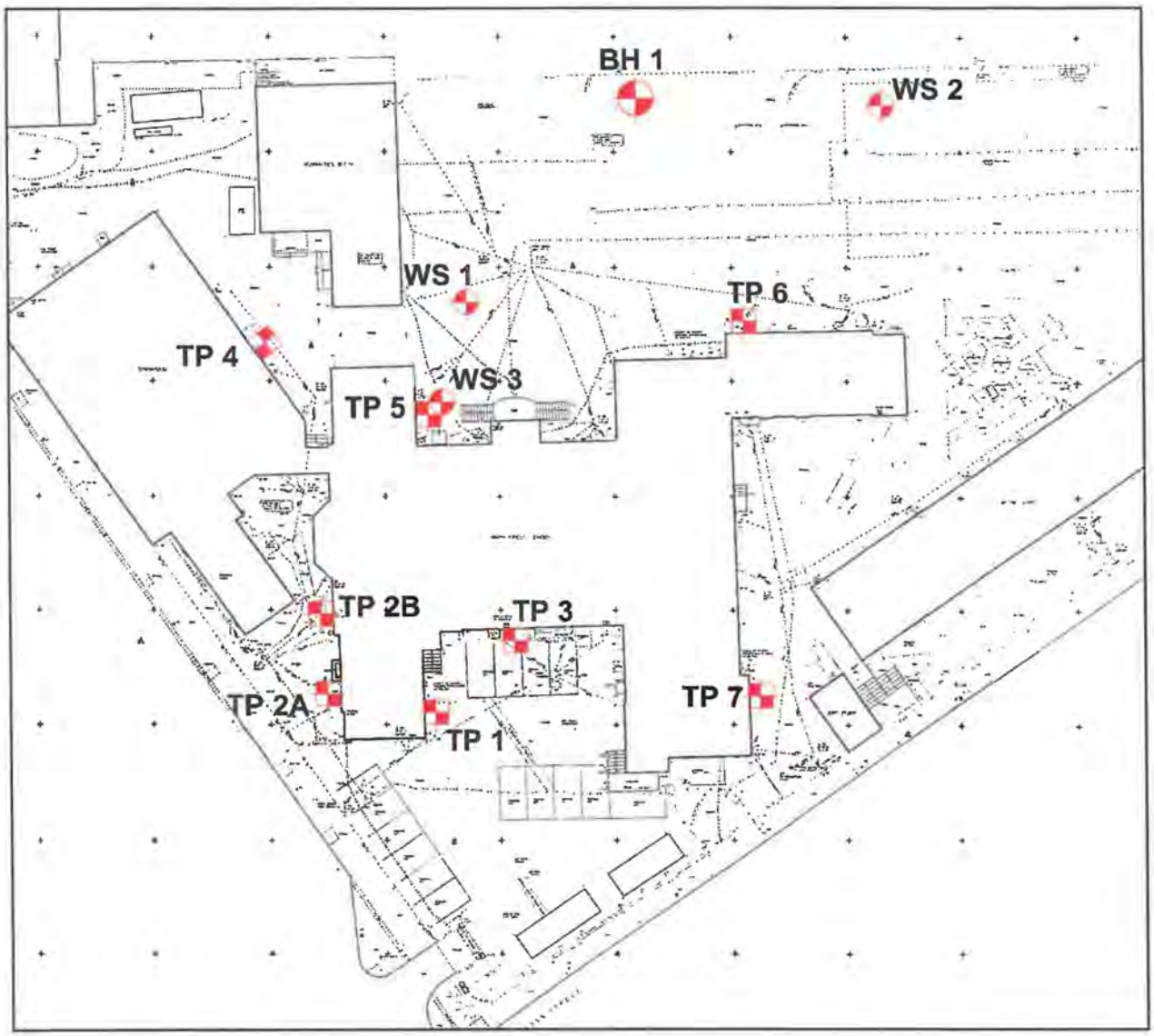
Exploratory Hole Location Plan

Reproduced from a plan provided by the client.



Key

- Cable Percussive Borehole
- Window Sample Borehole
- Foundation Inspection Pit

Not To Scale

Project : Maria Fidelis Lower School, London NW1 **Client :** Camden Council	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C14593**

GROUND ENGINEERING LIMITED

Tel: 01733-566566
www.groundengineering.co.uk

Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

BOREHOLE
BH1

Date: 22/10/18

Hole Size: 150mm dia to 15.00m

Ground Level: 24.75m. O.D.

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
0.10-0.30	B1				MADE GROUND - ASPHALT.		0.10	24.65
0.30-0.80	B2				MADE GROUND - Brown and dark brown, silty SAND AND GRAVEL. Gravel of flint, brick, asphalt, concrete and asbestos containing material fragments.			
1.00-1.20	B3						1.00	23.75
1.20-1.30	B4				MADE GROUND - Soft, brown, light brown and dark brown mottled, slightly sandy, slightly gravelly, silty CLAY. Gravel of flint, brick, mortar, limestone and coal fragments.			
1.35-1.65	C	N6						
1.30-1.50	B5						1.50	23.25
1.50-1.80	B6				Firm, brown, orange brown and grey mottled, silty CLAY with occasional gravel size calcareous concretions.(HIGHLY WEATHERED LONDON CLAY)			
2.00-2.45	U1	35	2.00				2.00	22.75
2.45	D1				Firm, closely fissured, brown CLAY with grey stained fissures.			
3.00-3.45	U2	35	2.50		(WEATHERED LONDON CLAY)			
3.45	D2							
4.10-4.55	U3	45	2.50		...becoming stiff with occasional selenite crystals from 4.00m depth.			
4.55	D3				...weak, orange brown, argillaceous, concretionary limestone at 4.60m depth.			
4.70-4.85	B7							
5.00-5.45	U4	47	2.50					
5.45	D4						5.40	19.35
6.10-6.55	U5	50	2.50		Stiff, closely fissured, grey brown CLAY with rare gravel size pyrite nodules and rare dendrites of manganese oxide.			
6.55	D5							
7.00-7.45	U6	50	2.50					
7.45	D6			BENEATH INSTALLATION				
8.00	D7			BENEATH INSTALLATION	(LONDON CLAY)			
8.50-8.95	U7	55	2.50	BENEATH INSTALLATION				
8.95	D8			BENEATH INSTALLATION				
9.50	D9			BENEATH INSTALLATION				
10.00-10.45	U8	60	2.50	BENEATH INSTALLATION			10.00	14.75

REMARKS
1. Excavating a pit from 0.00m to 1.20m for 1.25 hours
2. Borehole cased to 2.50m depth
3. Gas monitoring standpipe installed to 7.00m depth

Project No 14593

Scale 1:50

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KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test
Cohesion ( ) kPa
▼c Level on completion
c▼w Level casing withdrawn
▼s Standpipe Level

Groundwater Strikes

No	Struck	Depth m Rose to	Rate	Cased	Sealed

Groundwater Observations

Date	Depth m Hole	Casing	Water
22/10/18	15.00	2.50	dry
22/10/18	15.00	0.00	dry
07/11/18	7.00		dry
14/11/18	7.00		dry
21/11/18	7.00		dry

GROUND ENGINEERING LIMITED

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

BOREHOLE BH1

Date: 22/10/18

Hole Size: 150mm dia to 15.00m

Ground Level: 24.75m. O.D.

Samples and in-situ Tests			(Date) Casing	Inst.	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Blows						
				BENEATH INSTALLATION	Very stiff, becoming stiff, closely fissured, grey brown CLAY with rare dark grey silt partings and rare pyrite nodules.		10.00	14.75
10.45	D10			BENEATH INSTALLATION				
11.00	D11			BENEATH INSTALLATION	(LONDON CLAY)			
11.50-11.95	U9	60	2.50	BENEATH INSTALLATION				
11.95	D12			BENEATH INSTALLATION				
12.50	D13			BENEATH INSTALLATION			12.50	12.25
				BENEATH INSTALLATION	Stiff, grey brown, slightly sandy, silty CLAY with occasional light grey and light brown silt partings and rare pyrite nodules.			
13.00-13.45	U10	60	2.50	BENEATH INSTALLATION				
13.45	D14			BENEATH INSTALLATION	(LONDON CLAY)			
14.00	D15			BENEATH INSTALLATION				
14.50-14.95	U11	60	2.50	BENEATH INSTALLATION			14.50	10.25
				BENEATH INSTALLATION	Very stiff, closely fissured, grey brown CLAY. (LONDON CLAY)			
15.00	D16						15.00	9.75
					Borehole completed at 15.00m depth			

REMARKS

Project No 14593

Scale 1:50 | Page 2/2

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
S/C - SPT Spoon/Cone
▽ Water Strike
▼ Water Rise
N/* - SPT Blows for 0.3m or given penetration
ES - Environmental Sample
V - Vane Shear Test Cohesion ( ) kPa
▽c Level on completion
c▽w Level casing withdrawn
▽s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water

GROUND ENGINEERING LIMITED

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

WINDOW SAMPLE
WS1

Date: 23/10/18

Hole Size: 87mm dia to 2.00m
77mm dia to 3.00m
57mm dia to 5.45m

Ground Level: 25.00m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.10	24.90
0.30	D1			MADE GROUND - Dark brown, slightly silty SAND AND GRAVEL with occasional cobbles of brick. Gravel of brick, asphalt, concrete and mortar fragments.		0.40	24.60
0.60	D2			MADE GROUND - Soft, brown, orange brown, dark brown and dark grey mottled, slightly gravelly, silty CLAY with occasional oyster shell fragments. Gravel of flint, brick, glass and ash fragments.			
0.90	D3						
1.10	D4						
1.20	D5						
1.20-2.00	U1						
1.35-1.65	S	N7				1.40	23.60
				Stiff, brown and orange brown mottled, slightly gravelly, silty CLAY. Gravel of sub-angular to rounded flint and limestone. (HEAD DEPOSIT)		1.80	23.20
2.00-3.00	U2			Stiff, brown, orange brown and grey mottled, silty CLAY with rare calcareous concretions. (HIGHLY WEATHERED LONDON CLAY)		2.10	22.90
2.30	V1	(94)		Stiff, closely fissured, brown CLAY with grey stained fissures and rare orange brown silt partings.			
2.60	V2	(103)					
2.90	V3	(103)					
3.00-4.00	U3			(WEATHERED LONDON CLAY)			
3.20	V4	(108)					
3.50	V5	(104)		...with occasional selenite crystals from 3.60m depth.			
3.80	V6	(118)					
4.00-5.00	U4						
5.00	D6						
5.15-5.45	S	N25					
				Hole completed at 5.45m depth		5.45	19.55

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth

Project No 14593

Scale 1:50 | Page 1/1

KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
▽ Water Strike
▽c Depth to Water on completion
J - Jar Sample
M - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
P( ) - Hand Penetrometer Cohesion ( ) kPa
▽s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						23/10/18	5.45		dry

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

WINDOW SAMPLE
WS2

Date: 23/10/18

Hole Size: 87mm dia to 2.00m
77mm dia to 3.00m
57mm dia to 5.45m

Ground Level: 24.60m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.10	24.50
0.30-0.70	B1			MADE GROUND - Brown and dark brown, silty SAND AND GRAVEL with rare cobbles of brick. Gravel of brick, flint, asphalt, pottery, mortar and slag fragments.			
0.30	D1						
0.50	D2						
0.70	D3						
1.10	D4						
1.20	D5						
1.20-2.00	U1						
1.35-1.65	S	N5				1.40	23.20
				MADE GROUND - Soft, dark brown, slightly sandy, slightly gravelly, silty CLAY. Gravel of flint, brick, pottery, coal and ash fragments.			
2.00	D6						
2.00-3.00	U2						
2.15-2.45	S	N7				2.20	22.40
				Stiff, brown, orange brown and grey mottled, silty CLAY with occasional part decayed roots and orange brown silt partings. (HIGHLY WEATHERED LONDON CLAY)		2.60	22.00
				Stiff, closely fissured, brown CLAY with grey stained fissures, occasional orange brown staining to 3.70m depth and rare pyrite nodules.			
3.00-4.00	U3						
3.15	V1	(86)					
3.50	V2	(102)		(WEATHERED LONDON CLAY)			
3.90	V3	(121)		...With occasional selenite crystals from 4.00m depth.			
4.00-5.00	U4						
4.20	V4	(110)					
4.50	V5	(124)		...50mm thick, very weak, orange brown and red brown, argillaceous concretionary limestone at 4.70m depth.			
4.90	V6	(122)					
5.00	D7						
5.15-5.45	S	N22				5.45	19.15
				Hole completed at 5.45m depth			

REMARKS 1. Starter pit excavated from 0.00m to 1.20m depth

Project No 14593

Scale 1:50

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KEY

D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
▽ Water Strike
▽c Depth to Water on completion
J - Jar Sample
M - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
P( ) - Hand Penetrometer Cohesion ( ) kPa
▽s Standpipe Level

Groundwater Strikes						Groundwater Observations			
	Depth m						Depth m		
No	Struck	Rose to	Rate	Cased	Sealed	Date	Hole	Casing	Water
						23/10/18	5.45		dry

GROUND ENGINEERING LIMITED

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Site: **MARIA FIDELIS LOWER SCHOOL, LONDON NW1**

WINDOW SAMPLE WS3

Date: 23/10/18

Hole Size: 87mm dia to 2.00m
77mm dia to 3.00m
57mm dia to 5.45m

Ground Level: 25.30m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.15	25.15
				MADE GROUND - Dark grey SAND AND GRAVEL with occasional cobbles of brick. Gravel of flint, brick, asphalt and mortar fragments.		0.50	24.80
				MADE GROUND - Soft, brown, dark brown and dark grey mottled, slightly sandy, slightly gravelly, silty CLAY. Gravel of flint, brick, concrete, clinker and ash fragments.			
1.30-2.00	U1					1.50	23.80
2.00-3.00	U2			Firm, brown, orange brown and grey mottled, slightly gravelly, silty CLAY. Gravel of flint and limestone fragments, with iron staining on gravel. (HEAD DEPOSIT)		2.20	23.10
				Stiff, brown, orange brown, grey mottled silty CLAY with occasional orange brown sand partings. (HIGHLY WEATHERED LONDON CLAY)		2.50	22.80
				Stiff, closely fissured, brown CLAY with grey stained fissures and rare pyrite nodules.			
3.00-4.00	U3						
3.30	V1	(105)		(WEATHERED LONDON CLAY)			
3.60	V2	(106)					
3.90	V3	(107)		...with rare selenite crystals from 4.00m depth and a 50mm thick, weak, red brown argillaceous concretionary limestone at 4.40m depth.			
4.00-5.00	U4						
4.10	V4	(140+)					
4.50	V5	(126)					
						4.80	20.50
4.90	V6	(140+)		Stiff, closely fissured, grey brown CLAY.			
5.00	D1						
5.15-5.45	S	N20		(LONDON CLAY)			
						5.45	19.85
				Hole completed at 5.45m depth			

REMARKS 1. Starter pit excavated from 0.00m to 1.30m depth

Project No 14593

Scale 1:50 | Page 1/1

KEY
D - Disturbed Sample
B - Bulk Sample
U - Undisturbed Sample
W - Water Sample
▽ Water Strike
▼c Depth to Water on completion
J - Jar Sample
M - Mackintosh Probe
V - Vane Shear Test Cohesion ( ) kPa
P( ) - Hand Penetrometer Cohesion ( ) kPa
▼s Standpipe Level

Groundwater Strikes

No	Struck	Depth m Rose to	Rate	Cased	Sealed

Groundwater Observations

Date	Depth m Hole	Casing	Water
23/10/18	5.45		dry

GROUND ENGINEERING LIMITED
Tel: 01733-566566
www.groundengineering.co.uk

Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP1

Date: 23/10/18

Pit Size: 0.80m L x 0.40m W x 1.30m D.
Hole Size: 70mm dia to 1.70m

Ground Level: 25.65m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.10	25.55
0.30 0.30	D1 ES1			MADE GROUND - Brown and dark brown, silty SAND AND GRAVEL with occasional cobbles of brick. Gravel of flint, brick and asphalt fragments.		0.40	25.25
0.70 0.70	D2 ES2			MADE GROUND - Brown, clayey SAND AND GRAVEL with occasional cobble size voids. Gravel of brick, mortar and slate fragments.			
1.00 1.00	D3 ES3						
1.60-1.70 1.60-1.70	D4 ES4						
				Pit abandoned at 1.70m depth		1.70	23.95

KEY
- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS
1. No live roots observed
2. Pit dry
3. Pit sides stable
4. 100mm diameter gas pipe at 1.20m depth
5. Pit extended from 1.30m to 1.70m depth using hand auger tools
6. Pit abandoned at 1.70m depth, unable to extend further with hand auger

Project No 14593

Scale 1:25

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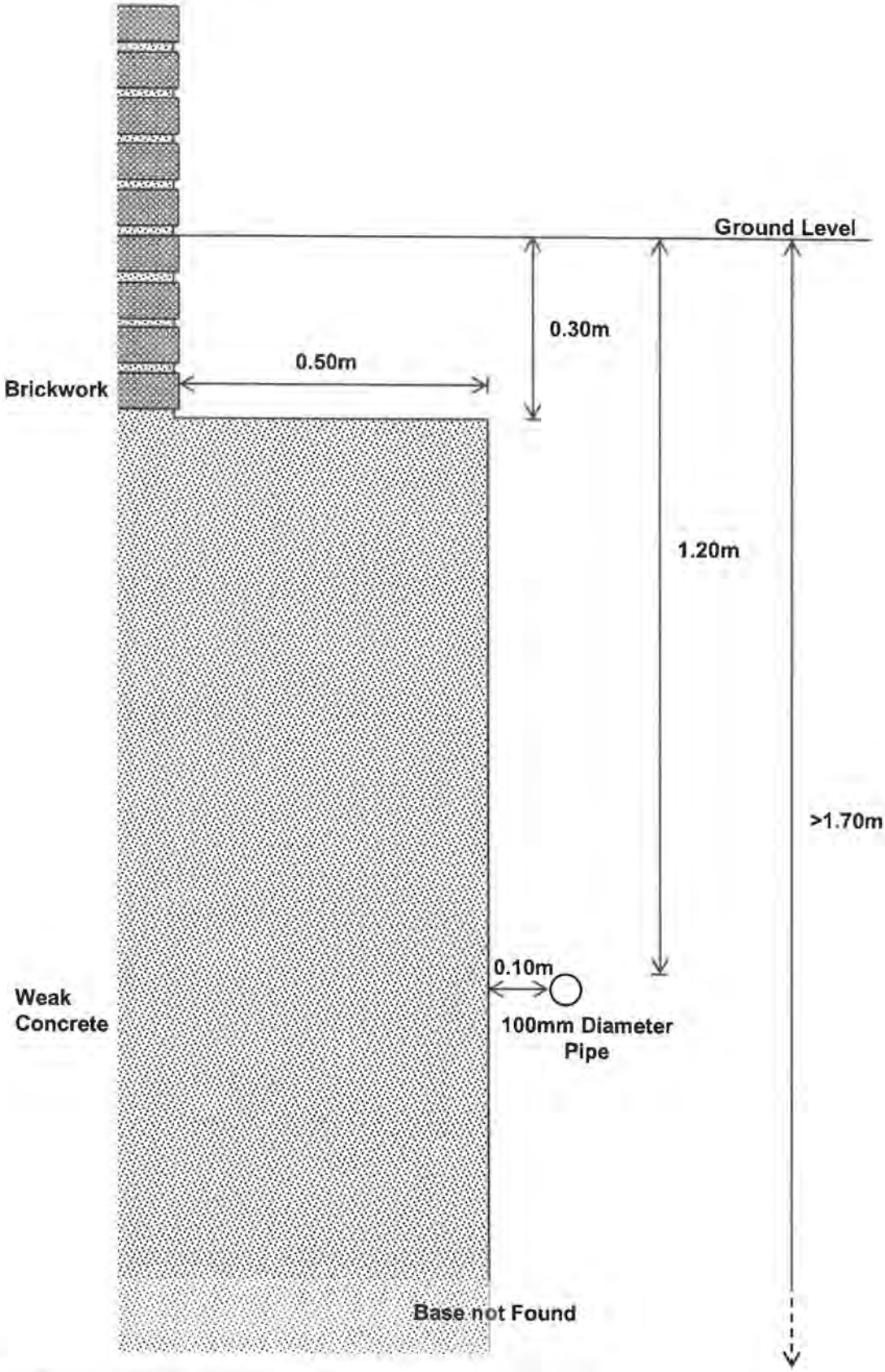
Trial Pit TP 1
Cross Section A-A



Not To Scale

Project : Maria Fidelis Lower School, London NW1 Client : Camden Council	GROUND ENGINEERING LIMITED Peterborough Tel : 01733 566566	Project No. C14593

Trial Pit TP 1
Photographs

Project : Maria Fidelis Lower School, London NW1 **Client : Camden Council**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C14593**

GROUND ENGINEERING LIMITED
Tel: 01733-568566
www.groundengineering.co.uk

Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP2A

Date: 23/10/18

Pit Size: 0.60m L x 0.45m W x 0.20m D.

Ground Level: 25.65m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.05	25.60
				MADE GROUND - CONCRETE.		0.20	25.45
				Pit abandoned at 0.20m depth			

KEY
- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS 1. Pit abandoned at 0.20m depth due to suspected service

Project No 14593

Scale 1:25

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GROUND ENGINEERING LIMITED

Tel: 01733-566566
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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP2B

Date: 23/10/18

Pit Size: 0.60m L x 0.50m W x 1.80m D.
Hole Size: 70mm dia to 2.30m

Ground Level: 25.70m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.10	25.60
0.30	D1			MADE GROUND - Dark grey, silty SAND AND GRAVEL. Gravel of limestone, brick and asphalt fragments.			
0.30	ES1					0.35	25.35
0.60	D2			MADE GROUND - Soft, brown, slightly sandy, slightly gravelly, silty CLAY with occasional cobbles of brick. Gravel of flint, quartzite, brick, asphalt and slate fragments.			
0.60	ES2						
0.90	D3						
0.90	ES3					1.00	24.70
1.20	D4			MADE GROUND - Firm, brown and orange brown mottled, slightly sandy, slightly gravelly, silty CLAY. Gravel of flint, limestone, brick and ash fragments.			
1.20	ES4						
1.50	D5						
1.50	ES5						
1.80	D6						
1.80	ES6						
2.10-2.30	D7						
						2.30	23.40
				Pit abandoned at 2.30m depth			

KEY
- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS
1. No live roots observed
2. Pit dry
3. Pit sides stable
4. Pit extended from 1.80m to 2.30m depth using hand auger tools
5. Pit abandoned at 2.30m depth upon suspected footing, unable to find edge due to pea gravel entering hand auger hole

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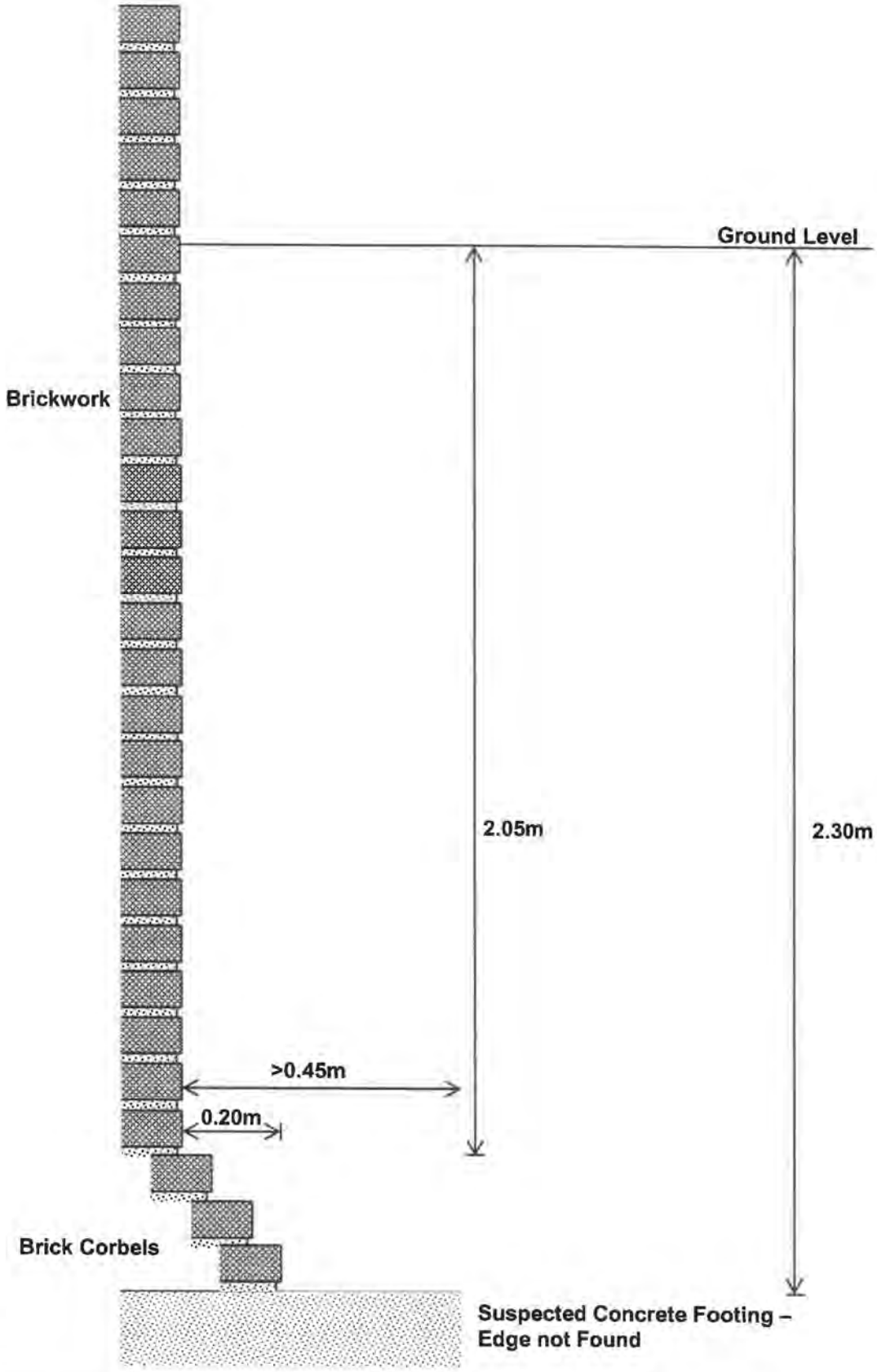
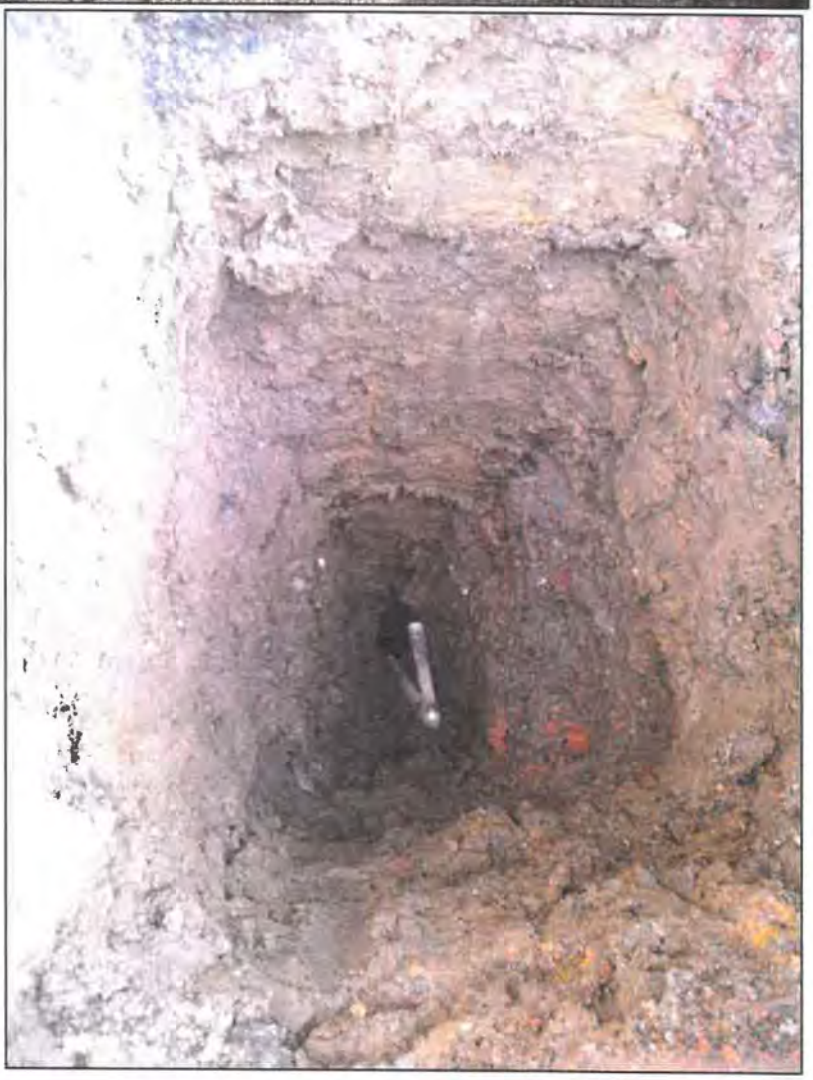
Trial Pit TP 2B
Cross Section A-A



Not To Scale

Project : Maria Fidelis Lower School, London NW1 Client : Camden Council	GROUND ENGINEERING LIMITED Peterborough Tel : 01733 566566	Project No. C14593

Trial Pit TP 2B
Photographs



Project : Maria Fidelis Lower School, London NW1 **Client :** Camden Council	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C14593**

GROUND ENGINEERING LIMITED

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP3

Date: 23/10/18

Pit Size: 0.60m L x 0.50m W x 1.50m D.
Hole Size: 70mm dia to 3.20m

Ground Level: 25.65m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.10	25.55
0.40	D1			MADE GROUND - Dark brown and dark grey SAND AND GRAVEL. Gravel of asphalt and brick fragments.			
0.40	ES1					0.50	25.15
0.70	D2			MADE GROUND - Brown and orange brown, clayey SAND AND GRAVEL with occasional cobbles of brick. Gravel of flint, brick and concrete fragments.			
0.70	ES2						
1.00	D3						
1.00	ES3						
1.30	D4						
1.30	ES4					1.50	24.15
1.60	D5			MADE GROUND - Firm, brown and orange brown mottled, slightly sandy, slightly gravelly, silty CLAY. Gravel of flint, brick, slate and ash fragments.			
1.60	ES5						
2.00-2.20	D6						
2.50-2.80	D7						
3.10-3.20	D8					3.20	22.45
				Pit abandoned at 3.20m depth			

KEY
- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS
1. No live roots observed
2. Pit dry
3. Pit sides stable
4. Pit extended from 1.50m to 3.20m depth using hand auger tools
5. Pit abandoned at 3.20m depth upon suspected footing

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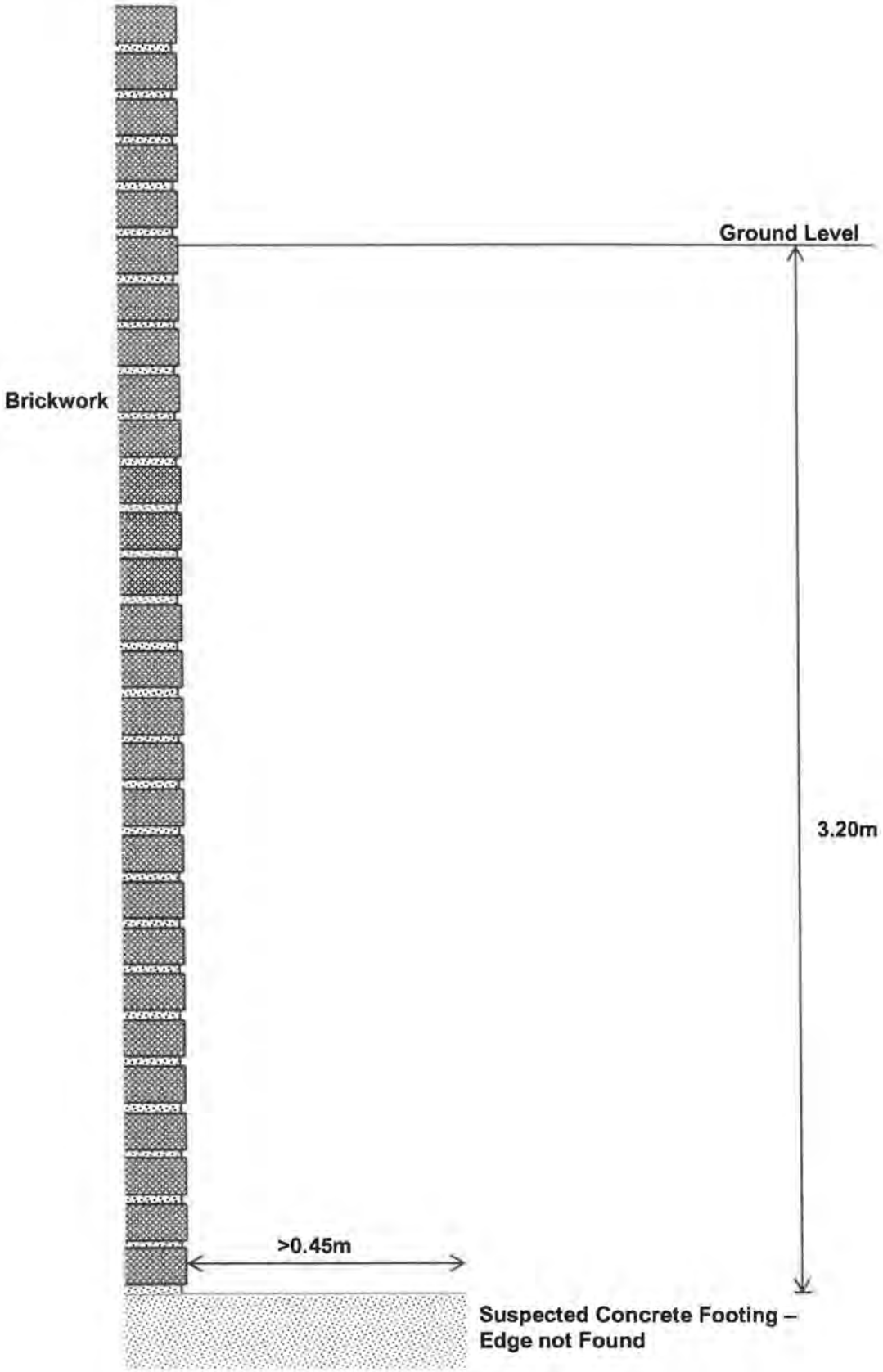
Trial Pit TP 3
Cross Section A-A



Not To Scale

Project : Maria Fidelis Lower School, London NW1 Client : Camden Council	GROUND ENGINEERING LIMITED Peterborough Tel : 01733 566566	Project No. C14593

Trial Pit TP 3
Photographs

Project : Maria Fidelis Lower School, London NW1 **Client :** Camden Council	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** **C14593**

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP4

Date: 23/10/18

Pit Size: 0.70m L x 0.45m W x 1.30m D.
Hole Size: 70mm dia to 1.50m

Ground Level: 25.15m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.15	25.00
0.40	D1			MADE GROUND - Brown, silty SAND AND GRAVEL with occasional cobbles of brick. Gravel of flint, limestone, brick, concrete, asphalt and clinker fragments.			
0.40	ES1					0.50	24.65
0.70	D2			MADE GROUND - Soft, brown and dark grey mottled, slightly sandy, slightly gravelly, silty CLAY with occasional cobbles of brick and occasional oyster shell fragments. Gravel of brick, asphalt, mortar and ash fragments.			
0.70	ES2						
0.90	D3						
0.90	ES3						
1.10	D4						
1.10	ES4					1.15	24.00
1.10	V1	(93)		MADE GROUND - Stiff, brown, orange brown and dark grey mottled, slightly sandy, slightly gravelly, silty CLAY. Gravel of flint, calcareous concretions, brick, mortar and ash fragments.			
1.20	V2	(91)					
	V3	(95)					
1.30	D5						
1.50	D6					1.50	23.65
				Pit completed at 1.50m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. No live roots observed
2. Pit dry
3. Pit sides stable
4. Hole extended from 1.30m to 1.50m depth with hand auger tools

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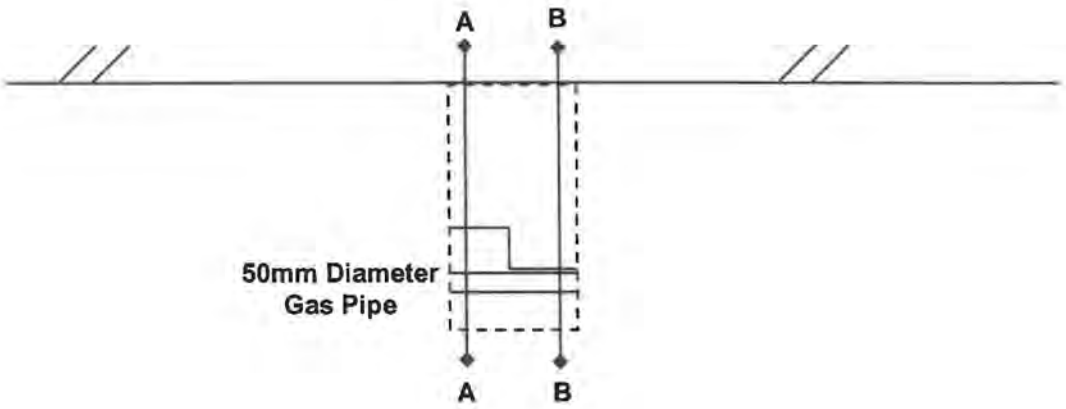
Trial Pit TP 4
Plan

GYMNASIUM



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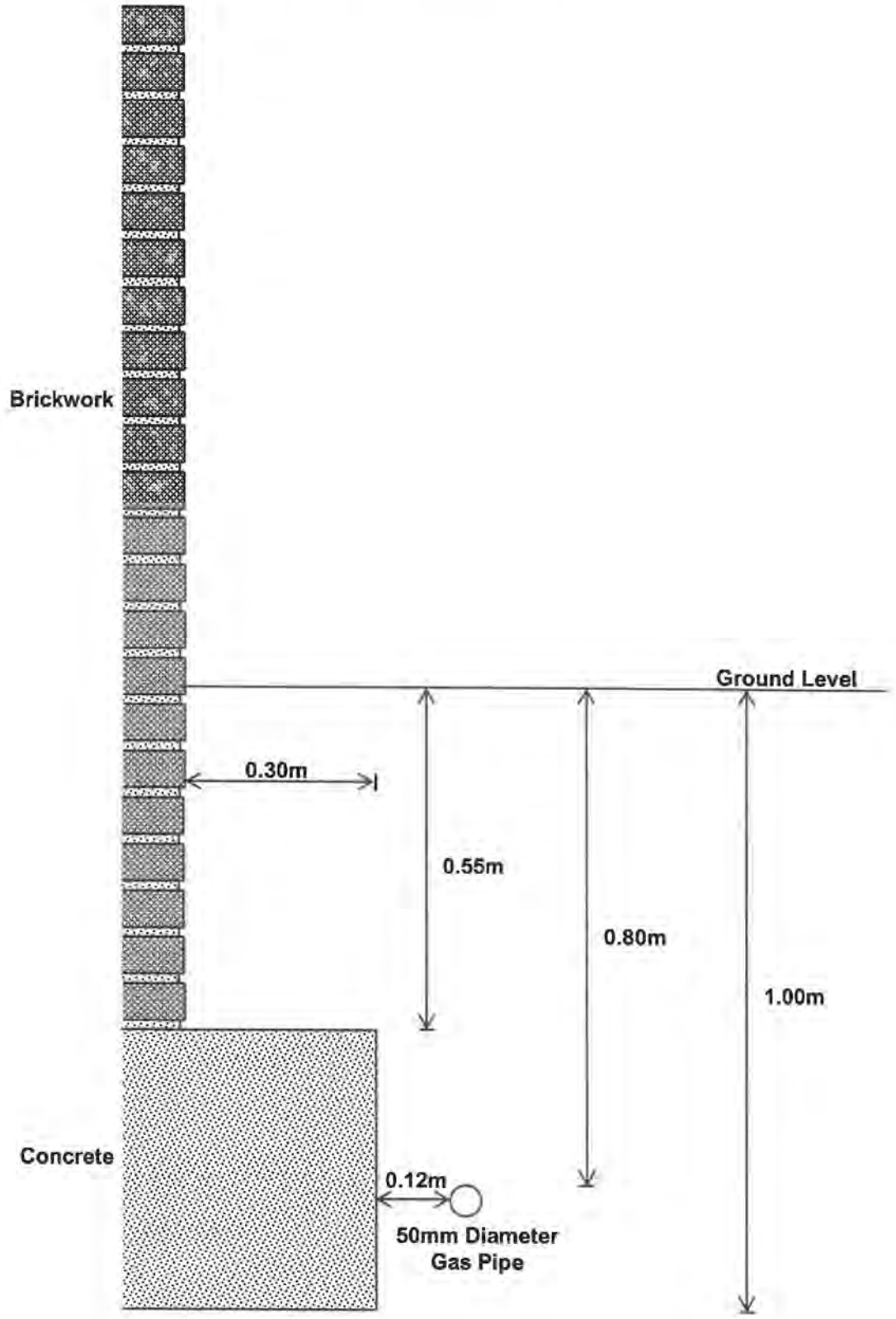
Trial Pit TP 4
Cross Section A-A



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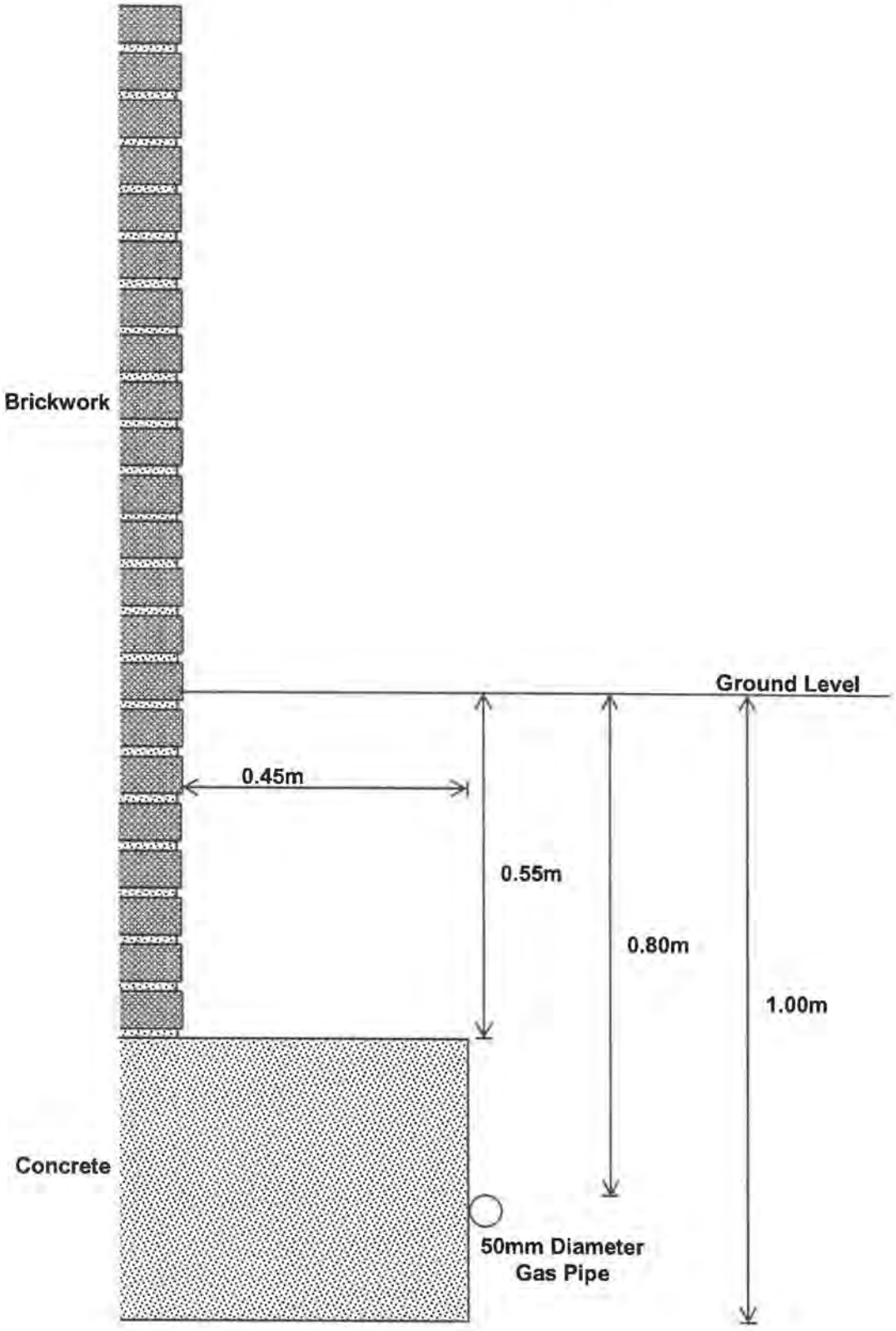
Project : Maria Fidelis Lower School, London NW1 Client : Camden Council	GROUND ENGINEERING LIMITED Peterborough Tel : 01733 566566	Project No. C14593

Trial Pit TP 4
Cross Section B-B



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Project : Maria Fidelis Lower School, London NW1 Client : Camden Council	GROUND ENGINEERING LIMITED Peterborough Tel : 01733 566566	Project No. C14593

Trial Pit TP 4
Photographs

Project : Maria Fidelis Lower School, London NW1 **Client :** Camden Council	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No.** C14593

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP5

Date: 23/10/18

Pit Size: 0.70m L x 0.45m W x 1.50m D.
Hole Size: 70mm dia to 1.80m

Ground Level: 25.30m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.15	25.15
0.20	D1			MADE GROUND - Dark grey SAND AND GRAVEL with occasional cobbles of brick. Gravel of flint, brick, asphalt and mortar fragments.		0.30	25.00
0.20	ES1						
0.50	D2			MADE GROUND - Firm, brown, orange brown, grey mottled, slightly gravelly, silty CLAY. Gravel of brick, pottery, vitrified pipe, clinker and ash fragments.			
0.50	ES2						
0.70	V1	(45)					
0.80	D3						
0.80	ES3						
1.10	D4						
1.10	ES4						
1.40	D5						
1.40	ES5						
1.60	V2	(130+)				1.60	23.70
1.70	D6			Stiff, brown and orange brown mottled, slightly gravelly CLAY. Gravel of sub-angular to rounded flint. (HEAD DEPOSIT)		1.80	23.50
1.70	V3	(130+)					
				Pit completed at 1.80m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. No live roots observed
2. Pit dry
3. Pit sides stable
4. Pit extended from 1.50m to 1.80m depth with hand auger tools

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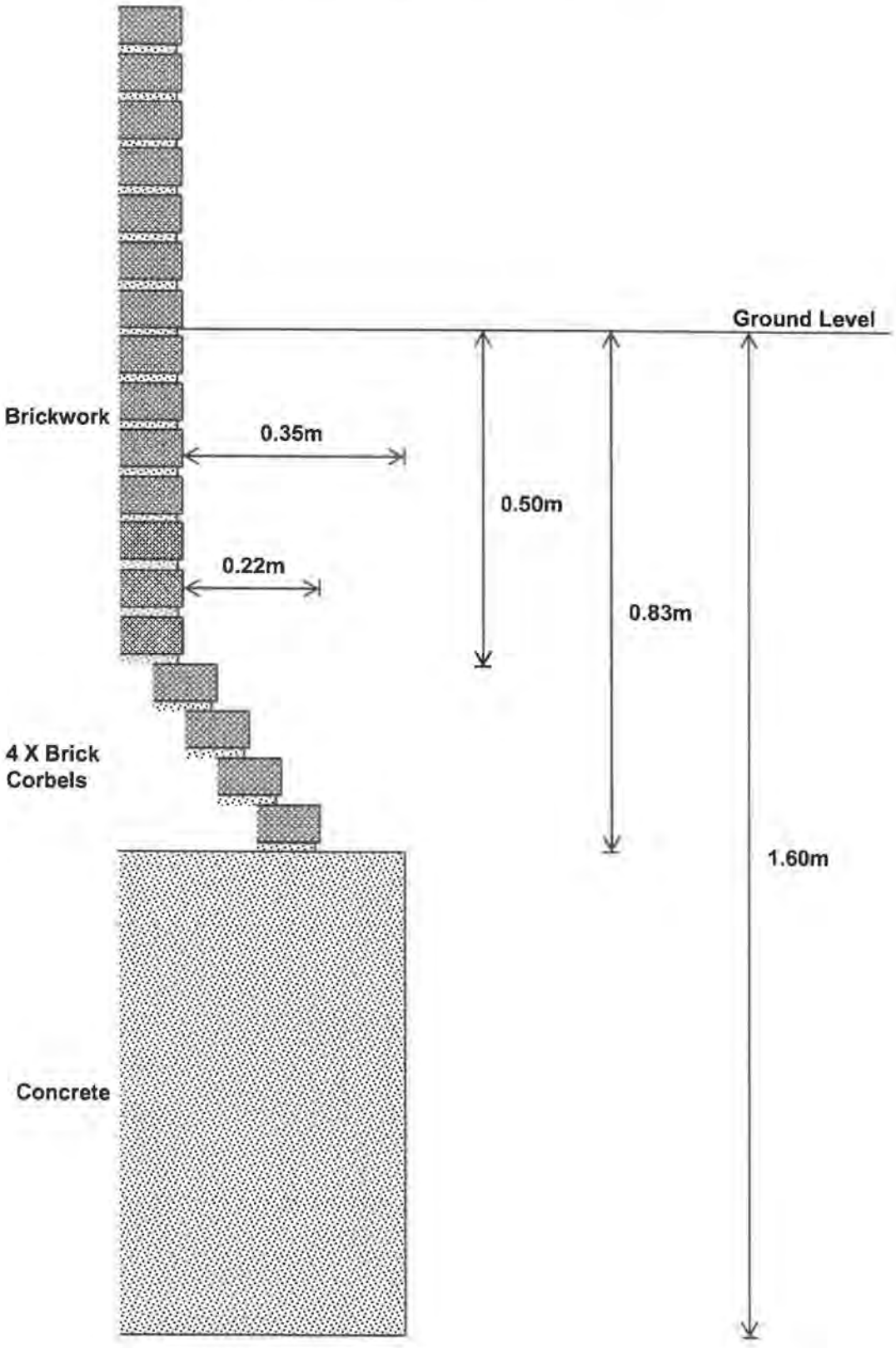
Trial Pit TP 5
Cross Section A-A



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Trial Pit TP 5
Photographs

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP6

Date: 23/10/18

Pit Size: 0.60m L x 0.45m W x 1.70m D.

Ground Level: 25.10m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.15	24.95
0.35	D1			MADE GROUND - Brown and dark grey SAND AND GRAVEL with occasional cobbles of brick. Gravel of flint, brick, asphalt and concrete fragments.			
0.35	ES1					0.45	24.65
0.65	D2			MADE GROUND - Firm, brown and orange brown mottled, slightly sandy, slightly gravelly, silty CLAY with occasional cobbles of brick. Gravel of brick, concrete, mortar and ash fragments.			
0.65	ES2						
0.80	V1	(51)					
0.95	D3						
0.95	ES3						
1.25	D4						
1.25	ES4						
1.40	D5						
1.40	ES5					1.50	23.60
1.60	V2	(102)		Stiff, brown and orange brown, mottled, silty CLAY with many gravel size calcareous concretions. (HIGHLY WEATHERED LONDON CLAY)		1.70	23.40
1.70	D6						
1.70	V3	(110)		Pit completed at 1.70m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. No live roots observed
2. Groundwater met at 1.40m depth
3. Pit sides stable

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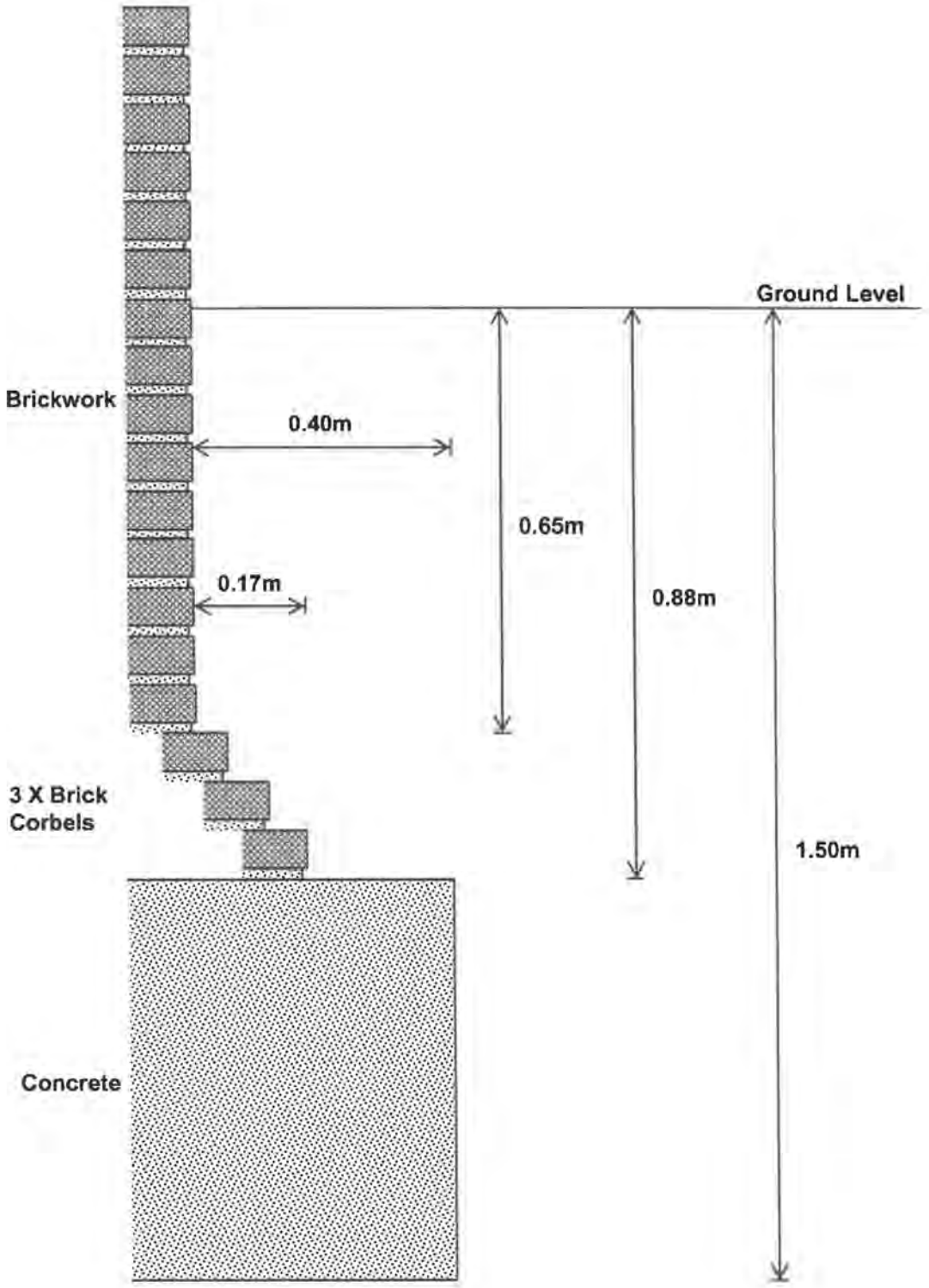
Trial Pit TP 6
Cross Section A-A



Not To Scale

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Trial Pit TP 6
Photographs

Project : Maria Fidelis Lower School, London NW1 **Client : Camden Council**	**GROUND ENGINEERING LIMITED** Peterborough Tel : 01733 566566	**Project No. C14593**

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Site: MARIA FIDELIS LOWER SCHOOL, LONDON NW1

TRIAL PIT
TP7

Date: 23/10/18

Pit Size: 0.60m L x 0.40m W x 1.20m D.
Hole Size: 70mm dia to 1.60m

Ground Level: 25.45m. O.D.

Samples and in-situ Tests			(Date) Water	Description of Strata	Legend	Depth m	O.D. Level m
Depth m	Type	Result					
				MADE GROUND - ASPHALT.		0.10	25.35
0.20	D1			MADE GROUND - Dark grey SAND AND GRAVEL with occasional cobbles of brick. Gravel of asphalt, brick and clinker fragments.			
0.20	ES1					0.30	25.15
				MADE GROUND - Brown, silty SAND AND GRAVEL with occasional oyster shell fragments. Gravel of flint, brick and concrete fragments.			
0.50	D2						
0.50	ES2						
0.80	D3						
0.80	ES3					0.95	24.50
				MADE GROUND - Soft, brown, slightly sandy, slightly gravelly, silty CLAY. Gravel of flint and brick fragments.			
1.20	D4						
1.20	ES4						
1.40	V1	(82)				1.40	24.05
1.50	D5			Stiff, brown and orange brown mottled, silty CLAY with many gravel size calcareous concretions. (HIGHLY WEATHERED LONDON CLAY)	× — ×		
1.60	V2	(91)			×	1.60	23.85
				Pit completed at 1.60m depth			

KEY

- D - Disturbed Sample
- B - Bulk Sample
- U - Undisturbed Sample
- R - Root Sample
- W - Water Sample
- ES - Environmental Sample
- ▽ Water Strike
- ▼ Water Rise
- ▼c Level on completion
- MP - Mackintosh Probe
- P( ) - Hand Penetrometer Cohesion ( ) kPa
- V - Vane Shear Test Cohesion ( ) kPa

REMARKS

1. No live roots observed
2. Pit dry
3. Pit sides stable
4. Pit extended from 1.20m to 1.60m depth with hand auger tools

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